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Operating With A Chinese Army Group

Colonel F. W. Boye, *Cavalry*
Former Commanding General, Central Sector, Chinese Combat Command

FOR years our people struggled in the China-Burma-India Theater in the accomplishment of the American mission which was to keep China intact as an offensively fighting ally; to limit the Japanese gains; and, from advanced airbases, to operate our Air Force offensively against the enemy. The 14th Air Force was undoubtedly the savior of China in the early years and, since everything they did was a gratuity to China, they experienced little friction. Initially the ground forces were organized into a Chinese Training and Combat Command which exercised a restraining control on the issuance of American equipment to the Chinese Armies. In the fall of 1944, after the departure of General Stilwell, a nominal reorganization was undertaken. This decision was influenced by the imminence of the Jap advance which had overrun airfields and which threatened the very existence of unoccupied China. Under the reorganization, the Chinese Combat Command was organized with General Ho Ying-chin as Supreme Commander. Shoulder to shoulder with him sat General Robert B. McClure and his staff in Kunming. They organized various sectors of the combat zones into Eastern, Central, Kwangsi, Southern and Reserve Sectors. Actual command was retained by the Chinese and agreement was made that the United States would equip and train a total of thirty-six divisions together with army troops for four army groups. This article describes only the activities in the Central Sector with the Third Army Group which has its headquarters at Kweiyang, capital of Kweichow Province.

From the high Tibetan plane to the west, rugged mountains roll their fingers to the east dividing China into a North, Central and South China. The Japs controlled the main arteries of the country by seizing the Yellow and Yangtze Rivers and by later edging up the West River from Canton. The Chinese Government, backed up into the western reaches of its own land, established its headquarters in Chungking. The opposition party, known as the Communists, was pushed into Yunnan. Kunming became the official back door of China. South of the Yangtze the country is rough, cut by rivers and deep gorges and traversed by dangerous roads. From the air China resembles a huge stained glass window, the panes of which are the ever present rice paddies alternated with grave mounds. It is a land of small villages. On the ground the points of civilization appear to be overflowing with hurrying people a great number of whom are in uniform. At one time when we were counting noses for rice distribution we found 575,000 military people to be fed and of this number not more than 160,000 were combat soldiers.

It would be well to describe briefly the enemy situation found at that time. In

1944 numerous Chinese armies had been defeated in Hunan and Kwangsi Provinces and the Jap columns had bored in, taking control of the railroad (although the retreating Chinese tore up the rails and hid them in the rice paddies), and of all other practical lines of communication. The enemy had reached Tuhshan, in Kweichow Province, when General T'ang En-po took over command with troops which had been rushed from the north. Happily the Japanese advance stopped at that time and for many months contact was maintained by two "country soldier" armies under T'ang's command. The Jap progress had been no bed of roses, because American OSS teams, operating with Chinese delaying columns, had blown bridges and roads sky high with American explosives.

Kweiyang, an ancient city in the undeveloped Kweichow Province was the headquarters of the Third Army Group. From there it was a rugged 300 miles to Kunming and a similar distance to Chungking. The enemy was about one hundred and fifty miles toward Ishan. Selected for training were the 13th Army, in the area south of the town; the 94th Army, located south and southeast of Chenyuan; and the 71st Army which trained in the Tuyun-Tuhshan corridor. Each army consisted of three divisions. With each army, an American team of some thirty officers and a like number of enlisted men was integrated with the Chinese command and staff and conducted the training. At that time China had approximately 500 nondescript divisions. In order to bring our thirty-six divisions to full strength, a number of existing divisions were deactivated and their personnel transferred. The actual breaking up of divisions caused commotion due principally to the fact that with the loss of their commands the various senior leaders found themselves minus jobs and practically off the pay roll of the army.

The scheduled deactivation of the 91st Division was particularly painful to Marshal T'ang. We all wanted to retain the 91st Division and break up the 16th Division. After much thought and fruitless effort to get the high command to reverse its decision the Marshal applied a simple solution to the problem by changing the names of the two divisions and then effecting the deactivation. Let no General try that in the U.S. Army!

Thanks to the tireless efforts of our Air Transport Command tons and tons of equipment were flown over the "hump" day and night. Jeeps, weapons carriers and even heavier trucks, badly needed, were included in the cargoes. That long awaited event, the opening of the Burma Road proved to be a failure insofar as the hauling of pay-load tonnage was concerned due to the tortuous road. On the China side every vehicle which could hobble along was employed in hauling. American truck companies were improvised by the American SOS and a block system of drivers was started so that equipment and supplies reached us with surprising rapidity. Training began in January 1945 in our sector. The initial period of instructor schools, followed by individual and small unit training presented few difficulties. Our prestige was high and the interest was keen.

Divisional training areas were very extensive due to the fact that the Chinese billet their troops in all the houses and buildings in the entire area. Thus a divisional training area might be spread over many miles. Billeting was accomplished without complaint. The owners or tenants simply crowded their families into smaller quarters and appeared to enjoy having the soldiers in their midst. Mats were spread on the floor in whatever space was available, rice cups were hung somewhere and the billet was ready for inspection. The sun was always welcomed in winter for then clothes could be aired and deloused, bodies could be washed and sunned and a general cleaning process started.

YELLOW RIV
YELLOW SEA
CHINA
HONAN
YELLOW RIV
NANKING
SOOCHOW
SHANGHAI
ANHWEI
HANGCHOW
SZECHWAN
YANGTZE RIV
CHUNGKING
HUNAN
CHIHKIANG
KWEICHOW
CHENYUAN
HENGYANG
FOOCHOW
KWEIYANG
TUYUN
TUHSHAN
KWEILIN
KUNMING
FORMOSA
YUNNAN
SI RIV
ISHAN
LIUCHOW
KWANGTUNG
KWANGSI
WUCHOW
CANTON
TANCHUCK
HONG KONG
RED RIV
FRENCH INDO-CHINA
SOUTH CHINA SEA
HAINAN
PHILIPPINES

Schools were practical in nature. Difficulties were increased because all instruction had to be carried on through interpreters. There are twenty-eight different dialects employed in China and it is not uncommon to find Chinese who cannot understand each other.

No attempt was made to conduct artillery training in the forward areas and all battalions were trained at an extensive Field Artillery School in the Kunming area. It was through the school system that a large part of American influence had been built initially. The Chinese love schools and are attentive and apt pupils. In the Third Army Group area the initial instruction was given to officers in rank from battalion commander to include army commander. Our engineer officers were hard pressed to conduct engineer training with a strictly limited amount of equipment. Division and army engineers were to face problems which would puzzle American engineers for the Chinese have little more than hand tools and a few other odds and ends.

We had a great deal more American equipment for our Signal Schools which were very successful. The low educational level among the junior officers and soldiers proved a great handicap in developing operators. We found our greatest field in this regard among boys of fifteen or sixteen—little keen eyed lads who had slipped into the army because they loved the soldier's life.

Medical training started from scratch. One never finds real doctors with troops. There are medical officers in all ranks but their knowledge and experience had been gained in hospital wards. So our American doctors spread all over China were a great boon to us. At Kweiyang we found a Chinese research and development hospital with a number of excellent Chinese doctors. This we used as our base medical school. We pushed forward our three American Evacuation Hospitals to work in conjunction with Chinese Field Hospitals and we furnished badly needed instruments and drugs. In this field the work was instructive and missionary in nature and for the first time sick and wounded soldiers received something resembling adequate care.

One would think that with the great expanse of China around and about us, training ground and target areas would be plentiful, but this was not the case, because the Chinese do not permit any bit of ground to remain uncultivated, so target ranges were constructed by hand, pointed across rice paddies, and maneuver ground was established in and about grave yards. A great part of the training time was employed in weapon training. The expenditure of target ammunition was pleasing and amazing to the Chinese; until that time each soldier had been limited to firing three rounds with the weapon with which he was armed.

Food was erratic. Requisition was made on the local magistrate for rice, the basic commodity, and it was his function to collect it from the local farmers. Money was given the various commanders to purchase supplemental food consisting of a little meat, vegetables, salt, peanut oil, charcoal, etc. If obtainable locally these articles were furnished, if not, the soldiers went without or begged such articles from their village friends.

Beyond the schooling phase the Leavenworth instructor would have gone quietly and completely "batty." From an American point of view it was logistically impossible to move and supply any Chinese Army in combat. Only one road with little or no maintenance extends in any one direction. Often this poor, miserable road was washed out by mountain slides and rivers in flood. All bridges in enemy held territory were completely destroyed. The small mountain railroad had completely disappeared. There were no organized cargo vehicular companies, and such Chinese SOS trucks they could muster limped along the road burning charcoal, alcohol or

a combination of vegetable oils. Spare parts were improvised and normal fourth echelon overhauls were accomplished right in the middle of a dusty and dirty road. Such loads as the troops actually moved were hauled on carrying sticks, individual loads of some sixty-five pounds. Each regiment had a transport company of 135 porters. Each division had one such battalion. The army was supposed to have a porter regiment plus a pack battalion but the horses were non-existent.

In spite of the logistical difficulties the Chinese marched on. In July 1945, our three armies were on the march; some were on foot and some were being shuttled forward in American trucks. During a visit of the Theater Commander we prepared a chart which showed where each unit could be found day by day. Much to our amazement all units were found at the scheduled places at the proper times!

In March the 94th Army was called to quit its training and fight. The Japs drove east to Chihkiang where they hoped to destroy our last remaining eastern airfield. The forces in the eastern sector fought well while two armies marched across the mountains to encircle the Jap flanks and rear. It was the first Jap taste of defeat in China. Later, in June, all training was suspended and the Third Army Group started a general advance following a Japanese withdrawal in the south.

We found no sense of defeatism in the re-occupied country. The town of Liuchow had thirty-four houses left standing of its original number of 30,000 yet the immediate thought was to flock back from the hills and immediately rebuild. Boats and sampans were needed and these miraculously appeared from the bottom of the river where they had been cached during the occupation. The Bank of China opened a temporary office and within two days had deposits numbering millions of Chinese dollars which had been well hidden. From the hills and the houses, Chinese farmers sniped at retreating columns and ambushed many Japs.

Speed without unnecessary planning was the order of the day. The high command paid no attention to details and it was left to the ingenuity of the subordinate

commanders to solve the local problems as they came in. The Third Army Group was truly "on the country" for there were no daily trains, no impetus of supply from the rear, for the rear was impassable. The ace in the hole in emergencies was air supply and air drop. The 13th Army, on arrival, in Liuchow was immediately dispatched southeast to Wuchow by marching with one division moving by boat and barge down the river to Tanchuk where they recaptured an airfield. The remainder of the Army Group closed on Kweilin from three sides and the harassed Jap garrison barely made good its withdrawal. Our fall objective would have been Canton but we were spared the headache of that enterprise by the declaration of peace.

It is interesting to review some of the traditional Chinese activities and tactics which proved to be stumbling blocks during the various campaigns. Security was impossible with Jap agents all about. All across China a single telephone line is maintained, and this is the heart and soul, the blood line of the Chinese Command. For years the War Office at Chungking had always taken command of the combat by long distance phone. In the spring of 1944 in the battle for Hengyang the Chinese far outnumbered the Jap invaders, yet in a short time the field was a hodge podge with marching and countermarching piecemeal attacks and indecisive fumbling due largely to counter orders issued from Chungking. The continuity of command was never maintained, for when a province or war zone boundary was reached it became a perogative of the new commander to take charge of the combat. All cities and towns are walled and ancient custom demanded that the defense always be conducted from within the city walls. Artillery was destined to be divided with one gun to each of several commanders. An acknowledged custom was always to give way to a frontal attack with the purpose of having the split column later effect a "bear-hug" on the sucked-in enemy. Unfortunately the "giving way" was always successful but the crushing "bear-hug" never materialized. It was traditional, too, to leave an honorable path of escape open to a surrounded enemy force. In fighting around Chihkiang a force of some 15,000 Japs, completely cut off, was practically given a safe-conduct to the rear. Many of these practices were deeply rooted and could not be dislodged either quickly or completely from the Chinese "Art of Combat."

The end of the war came suddenly and we were faced with another situation. National Army troops had to be moved quickly to Shanghai, Nanking and to Canton to take possession of those distant areas. The Third Army Group bundled the 94th Army into C-54 airplanes for the 900 mile flight to Shanghai where General T'ang assumed the area command. Under American control the army of 36,000 men was transported without incident. They took possession and disarmed the Japs quietly and efficiently. The actual surrender ceremony of the million and a quarter Japanese soldiers in China was completed in Nanking on 9 September, at nine minutes past nine o'clock on the ninth day of the ninth month of the ninth year of China's war. It was a solemn and great moment almost beyond their capacity to understand. Throughout the long years of war its people had suffered, its towns and cities had been destroyed, and its very existence threatened. Nevertheless, throughout the nine years China's spirit was strong and its heart was brave. Wherever a flag pole could be raised one always saw the flag of China snapping undaunted in the breeze. May it ever wave!

Analytical Study on

Leadership Instruction

A Student Committee, Command and Staff College

The analytical study on leadership appearing below is the work of Committee Number Seven, composed of four student officers of the Second Command Class at the Command and Staff College; (Colonel R. H. Naylor, CE; Colonel W. B. Kern, Inf.; Colonel J. R. Luper, AC; Lieutenant Colonel B. C. Chapla, Inf.). Much of the matrial was included in the form of appendices and annexes to the original document. The form of presentation has been changed somewhat, but the subject matter has not been altered.

—THE EDITOR.

Introduction

LEADERSHIP is the most potent factor in war. Yet, training in this subject has been left habitually to chance or to a few short subcourses in various service schools.

The mission of this committee has been to determine the effectiveness of present methods of training in leadership and to recommend improvements, if any. To do this, the committee has tried first to determine what leadership is; second, what has been the effectiveness of present methods and wherein those methods have failed; and lastly, what specific program should be followed to improve the leadership of the Army.

Definition of Leadership

Webster defines leadership as: "Office, position, or dignity of a leader; also ability to lead." The scope of this definition hardly fits the military, which is specifically interested in leadership which has the power to arouse, control, mould and direct the minds of men so that they will act in concert to attain the desired end.

Types of Leadership

By inspection we can determine five distinct types of leaders, in civil or military life, which conform to our definition: (1) the business leader who controls his business by the power of his personality to influence a few key men around him often using methods unacceptable to military ethics; (2) the foreman, or leader of small groups amongst the laboring classes; (3) the mass leader who leads by his ability to sway the minds of large groups; (4) the type of leader, exemplified in Einstein, who excels in sheer technical excellence; and finally, (5) the so-called good administrator.

We can find in the Army, leaders who combine almost any combination of the five classifications. In general, however, two principal types exist: (1) the small group leader such as the platoon leader or company commander, corresponding to the foreman of civil life; and (2) the mass leader, such as general officers commanding the corps or larger units, and combining proficiency in all five of our basic classifications, in the performance of many varied duties. As the small group leader progresses in rank, experience and responsi-

bility he gradually attains proficiency in the other four basic classifications of leadership. For example, the field officer commanding a regiment combines some of the characteristics of small group leadership with those of mass leadership.

Leadership is not Generalship

In any study of pure leadership, it is necessary to divorce the study from generalship in particular; and also from rank, intellect, efficiency, ability or command. In differentiating between leadership and generalship, Burns points out that McClellan could be rated a good leader but a poor general. Lacking the determination of Grant, he nevertheless left his mark on the Army of the Potomac until the end; and, after failures in generalship brought his relief from command, was still nominated for President. The true leader maintains his personal control. Perhaps the best description of the characteristics of this personal, intimate control of the mass leader is given by W. Trotter in his "Instincts of Herd in Peace and War." He states: "If a man is fluent, dexterous, and ready on the platform, he possesses the one indispensable requisite for statesmanship; if in addition he has the gift of moving deeply the emotions of his hearers, his capacity for guiding the infinite complexities of national life become undeniable. Experience has shown that no exceptional degree of any other capacity is necessary to make a successful leader. There need be no special training, no great weight of knowledge either of affairs or of the human heart, no receptiveness to new ideas, no outlook into reality. Indeed, the mere absence of such seems to be an advantage; for originality is apt to appear to the people as flightiness, skepticism as feebleness, caution as doubt of the great political principles that may happen at that moment to be immutable. The successful shepherd thinks like his sheep, and can lead his flock only if he keeps no more than the shortest distance in advance. He must remain, in fact, recognizable as one of the flock, magnified, no doubt, louder, coarser, above all with more urgent wants and ways of expression than the common sheep, but in the essence of their feeling of the same flesh with them. In the human herd the necessity of the leader bearing unmistakable marks of identification is equally essential. Variations from the normal standard in intellectual matters are tolerated if they are not very conspicuous, for man has never yet taken his intellect very seriously, and can still look upon intellectuality as not more than a peccadillo if not paraded too conspicuously. Variations from the moral standards are, however, of much greater significance as marks of identification, and when they become obvious, can at once change a great and successful leader into a stranger and an outcast, however little they may seem relevant to the adequate execution of his public work. If the leader's marks of identity with the herd are of the right kind the more they are paraded the better." Such becomes the picture of pure leadership when it is divorced from generalship and viewed apart from command and other allied qualities of the mind of the military leader.

Characteristics of Leadership

Trotter's definition of the leader minimizes the mental essentials and emphasizes the moral. Most other writers on the subject have contented themselves with empirical formulae for leadership, with long lists of adjectives and qualities for the leader, without analyzing the reasons therefor. It appears that human nature is such that the most impelling appeal to the masses is character, to which all empirical formulae and lists of superlatives add up. Character in this broad, moral sense alone seems to fulfill the conditions that the leader be capable of "arousing deeply the emotions" and of adherence to moral standards, failure of which will re-

duce the leader to "a stranger and an outcast."

Nearly all authoritative authors substantiate this conclusion. Jomini says: "One must recognize that character stands first on the qualities needed by Commanders-in-Chief; lastly that a combination of wise theory with a great character will constitute a great Captain." "A leader of men must have a great character, or moral courage which leads to great resolutions; that sang-froid or physical courage which dominates dangers. Knowledge appears only in third place, but it will be a powerful auxiliary—it would be blindness not to recognize this." General Sir Archibald Wavell says that the leader must know what he wants, must have the courage and determination to get it, and calls this "character." Major General M. B. Stewart says that the "True leader is one who by his qualities can create a worthy aspiration, and by precept and example can convert others to that aspiration and lead them in an unselfish cause." Regulations of the Navy prescribe that a commander shall have "virtue, honor, patriotism and subordination"—all moral forces.

This high degree of moral character in the leader must be activated by an impelling motive. Foch says "The will be conquer; such is victory's first condition, and therefore every soldier's duty; but it also amounts to a supreme resolve which the commander must, if need be, impart to the soldier's soul." Other powerful emotions, such as the ambition of Caesar and the hatred of the enemy of Hannibal, have activated leaders in history. In a democracy, however, the most impelling and unselfish activating force should be patriotism—again a moral quality.

Finally, a leader, in the army of a democracy at least, must subordinate himself to the good of the whole; and this must be voluntary, or insured by force of moral character, since the leader must frequently reach a position of rank and authority away from supervision or control from without. Even the President must subordinate himself to the people. It is this final quality of subordination to a cause, of humility, of selflessness and devotion to duty, which integrate into a unified whole the unit of the leader, whatever its size.

The closer a leader is to his men, the more important become all the factors of character. The small group leader, or company grade officer, living closely with his troops, will not be able to fool them long. Nobody can seem to be anything except what he is, and the character of the small group leader will not long be a secret from his men. On the other hand the character of the mass leader more generally reaches the mass through other than personal mediums of expression. However, neither can the mass leader fool the troops forever. There is no synthetic substitute for real character in a leader, even though he may be successful for a time during which he may hide its absence. Napoleon aroused France to a frenzy; but when the futility of conscription after conscription became apparent, no amount of personal magnetism could overcome the basic immorality of his designs for world conquest. Cries of "*Assez de Napoleon*" were heard throughout all France and the great leader fell.

What is Character Psychologically?

If leadership depends on character then what is character? We have described the evidences of character and listed qualities essential to the leader, but what causes those evidences and instills those qualities in civilized man? And what causes man to follow leaders so endowed? Leadership finally thus resolves itself into the study of man. Psychology presents natural laws governing the functions of the mind which the common garden variety of leader in an army must basically understand.

The behavior of man depends upon his

basic instincts rather than upon his powers of reason. Psychologists differ as to the number of basic instincts but for the purpose of this study we may accept the simplest, the triple grouping of Tansley: sex, ego, and the herd instincts. The instinct of self preservation is especially important to the leader, since it gives rise to fear. It is an instinct under the ego classification which also includes nutrition. Similarly the leader must understand the operation of all other instincts in order to manage his men intelligently and to predict their behavior under given conditions.

The mind consists of the unconscious and conscious minds, the unconscious being the seat of psychic energy emanating from the basic instincts therein. Inhibitions which have been implanted by training or environment are mere embellishments to the core of the mind which has only the basic instincts to guide it. In almost every human's experience is the memory of having at sometime or other acted in a way contrary to his own will. Such an act is the simple triumph of instinct over inhibition.

Many otherwise inexplicable human actions and rationalizations become clear when viewed in this light. The human mind is merely a mechanism for translating the basic instincts into action, and not for reason, which demands mental discipline and is a product of civilization. The conscious mind cannot prevent the constant workings of instinct within the unconscious mind, but intense conditioning of the conscious mind leads to a remarkable degree of control of behavior. Such control is frequently called "will power" and strikes close to the true definition of character, which may be well stated as the sum total of inhibitions within the conscious mind of man which in turn control his behavior according to a moral design rather than according to primitive instinct.

Man is more sensitive to the voice of the herd than to any other influence. Instinct, not logic, is the impelling energy which drives all animals, including man, into herds. The herd instinct causes man to be fearful of solitude, mental or physical. It can cause unreasoning panic, even in the absence of a crowd. It can inhibit or stimulate his thoughts and conduct, and can breed intolerance. It renders man remarkably susceptible to leadership.

Lastly, the herd-minded man is suggestible. McDougall defines suggestibility as a "process of communication resulting in the acceptance with conviction of the communication proposition in the absence of logical adequate grounds for its acceptance." Psychologists now accept this as a normal characteristic of the mind. It is common to all animals and seems to be a necessary mechanism to enable the herd to act in concert.

Racial Psychology

The popular, though unscientific conception of racial psychology must be clearly conceived by the leader who would avoid faulty management of his men. Some of the seeds of war lie in the power of popular misconceptions of racial differences. However, psychologists generally agree that there is no firm ground for supposing that there is, after all, any difference whatsoever in the basic instincts which motivate the minds of men in all ethnic groups. The type of American of the future will be the product of the American home, the school, the church; in short of the whole American social structure. Basic man, always the same fundamentally, will be the raw material in any society. Therefore, in order to determine the future types of American men, one must study American social and educational trends; for as the culture of a nation changes, and it is constantly changing, so also the man, the soldier, changes.

Summary

The American military leader, then, of

masses or of small groups, will utilize his men to attain a desired end by arousing, controlling, moulding and directing their minds through the exertion of the moral forces of character, as well as by sustaining the confidence thus won with good generalship which is solely the result of mental processes and which develop through the leader's career as he progresses in experience and responsibility. In order to lead, it follows that the leader must have a knowledge of men, of himself as well as of his followers. The force of character which bestows the power of leadership derives from moral and mental education and training. Men capable of higher education, both moral and mental, will achieve great character only as the sum total of their inhibitions controls the energy of the natural instincts into dynamic and moral action. Such men will be good leaders.

Discussion of Previous Methods of Training

Pre-War Training

Prior to World War I, instruction in the subject of leadership and the art of managing men occupied an insignificant place in the training program of the American Army. Such instruction as was received came as a by-product of theoretical and practical training in other subjects, plus self-study of the actions of great leaders of the past.

The experience of World War I caused an awakening to the importance of the subject on the part of many thoughtful officers, who realized that pre-war training had emphasized tactics as a geometrical interpretation of battle, ignoring the men who executed the plan. They became aware that a mental factor may have more to do with a victory than a material factor.

During the years between the two world wars, a number of excellent books and papers on leadership made their appearance, but they were presented to a relatively small audience. Occasional lectures on the empirical "do's" and "don'ts" of a competent leader were delivered to classes of noncommissioned officers and junior officers, but any critical analysis of leadership was reserved for the higher military education of the selected few who attended the Command and General Staff School and the Army War College. Even at these institutions, scheduled instructions did not exceed eight or ten hours in a one year course.

In 1942, the Educational Advisory Board of the Army considered a recommendation that the basic principles of psychology be taught at the U.S. Military Academy in connection with a course in Leadership. The Board recommended that "There should be conducted at the Military Academy and also in troop schools and in the instruction of the National Guard and Organized Reserves, a study of the subject of Leadership." The Board which consisted of the heads of all our various schools, was, however, clearly opposed to the introduction into this instruction of a theoretical course in psychology, although the understanding of men—a knowledge of how their minds work and are influenced, i.e., their psychology—is implicitly bound up with successful leadership.

The lack of critical and formal instruction in pre-commissioning and basic officers' schools was compensated to an extent, particularly at the U.S. Military Academy, by a system of education which markedly stressed the development of character in the officer, and thus indirectly imparted essential qualities of leadership.

This system resulted in the training of good small-group leaders but was deficient in training mass leaders who understood how to arouse the emotions of the masses.

At the onset of World War II, then, we possessed a small group of professional

officers possessing character, prestige, and ability, with much experience in small-group leadership but little experience in mass leadership, and who largely understood the application of the principles of leadership without a clear knowledge of the principles involved.

World War II Training

This officer corps was called upon to train wartime additions to its body which had expanded it some 8,000%. Under such conditions, the original body was far too diluted for the personal influence of its members to impinge sharply on the consciousness of great numbers of the new additions to the body. Furthermore, where the influence did impinge personally, it often did so only by precept and example, for his training often left the professional officer a competent leader, but an inarticulate instructor in leadership. To this failing was added the difficulty of experienced small-group leaders who were struggling to adjust themselves to the principles and conditions of mass leadership which were now present, to a lesser or greater degree, in the size of the commands which were entrusted to them in consonance with their higher wartime rank. Officers whose largest pre-war commands have never physically mustered more than a good sized battalion, found themselves in command of groups larger than those commanded by many of the great captains of the past.

The War Department and its subordinate training and field agencies instituted courses in Leadership for the new officers and noncommissioned officers during the expansion of the army prior to the outbreak of war, and continued them throughout the duration. These courses were largely empirical, designed to meet the needs of small-group leaders. Their scope was too limited, the time allotted for them too short, and the stress placed on them too little to produce satisfactory results.

Results

It cannot be stated that the program was a failure. It produced many capable, and a few exceptionally able leaders. The average product of the program led units of a winning army to victory over two enemies whose preparation and training had been far more lengthy.

In a sense, then, the success achieved was remarkable. However, it is the opinion of a great many officers that, while the average standard of leadership attained will always fall short of the standard desired, the average standard attained in the war fell far short of what was necessary, desirable and possible. Reports were numerous from all theaters, and numberless instances are cited by any group of officers with combat experience, of masses of officers who were indifferent to their responsibilities, who managed their men so poorly as to secure resentment but not discipline; who set poor, and in some cases scandalous personal examples to their men, and who failed to accomplish missions at which any reasonably competent leader could be rationally expected to succeed. The post-war complaints about the so-called "caste system" are attributable to a possibly small, but nevertheless far too large, percentage of officers who eagerly assumed the privileges of a leader while deliberately evading his concurrent responsibilities. And finally, while a letdown of conduct after the termination of war is man's natural reaction to a prolonged period of emotional intensity and insecurity, the poor discipline of our troops exceeds by far what should be expected of our army, and compares very unfavorably with the discipline of the former members of the vanquished enemy armies. Leaders were inadequate to secure discipline amongst themselves or to lead.

Reasons for Deficiencies

Three reasons are evident for not attaining a greater measure of success.

First, as previously stated, the corps of professional leaders was too diluted to have sufficient personal influence on the raw material from which new leaders come. Second, the time of training was too short for any system of education to have more than a superficial effect in moulding or modifying the previously formed character of the material selected for leadership. Third, and most important, the American environment as it existed between the wars and as it exists today failed to produce, on the average, the quality of character which is essential in a military leader. The credo that "anything goes" so long as one doesn't get caught; the acceptance of cheating in educational institutions as a normal and customary practice, the worship of material success regardless of the means employed; and the emphasis on the satisfaction of the desires of the individual, whether or not they are for the good of the community, did not produce a character of high moral fiber which inspires respect, confidence and loyalty, and which, given by superior authority a mission to perform, will determinedly and loyally accomplish the mission, regardless of personal considerations of effort, discomfort, or danger. The degredation of the original idea of the pursuit of happiness into the pursuit of material wealth or a high standard of living has produced a materialistic civilian incapable of quickly changing to the idealistic character demanded in a true leader.

Summary

The efforts made to instill leadership into the many new commanders of our wartime army were inadequate.

The national environment did not mould the character of the average citizen along proper lines to produce the type of character essential in a good military leader.

The influence of professional military leaders was limited by their small numbers and by the failure of their pre-war training to go deeply enough into the principles of the subject for them to exert greater influence in instruction.

Examples of Previous Formal Instruction in Leadership

Leadership may be, and is, developed as a corollary to training in a variety of military subjects.

The following are examples of formal instruction given at various levels.

a. Unit Training.—(1) Subject schedule No. 90, 1 May 1944, "Program for Noncommissioned Officers' Schools in Infantry Regiments," prepared by the Infantry School under direction of the Replacement and School Command, prescribes a five hour course for NCOs, to include psychological aspects, principles of conduct and applicatory exercises.

(2) Training Circular No. 18, Hq. ASFTC, Seventh Service Command, 26 January 1945, prescribes a ten hour course for officers consisting of eight conferences and one training film: "Leadership and the Negro Soldier."

(3) Training Circular No. 19, Hq. ASFTC, Seventh Service Command, 29 January 1945, prescribes a Leadership Training Course of nine weeks duration for prospective NCOs and other men who possess apparent leadership qualifications for NCO grades. All OCS applicants must have completed Phase One of the course.

(4) Letter from Hqs AAF, 7 February 1943, subject "Discipline and Leadership" prescribes that instruction in command duties and principles of leadership will be incorporated in training schedules, school courses, and operational and replacement training units.

(5) "Report on Status of Schools and Training Centers," NATOUSA, 28 December 1943, reports operation of a leadership and battle training center at Canastel, Algeria, for instruction of NCOs and company grade officers in command, discipline,

leadership and battlefield procedure. Duration of the course was four weeks.

(6) "Report on Combat Lessons," Hqs ETOUSA, 16 May 1945, states that leadership schools for officers and NCO's are conducted during all training periods.

b. Schools.—(1) "Information relative to the appointment and admission of Cadets to the United States Military Academy," 1942 states, under the heading "Department of Tactics," subheading "First Class" that "During the winter, instruction is given in . . . leadership. . . ."

(2) Program of Instruction for Officers Basic Course and Officer Candidate Course, The Infantry School, 1 April 1944 prescribes a six hour course in leadership, to consist of discussions of fundamental qualities; historical examples; and preparation and presentation of essays.

(3) Program of Instruction for Officer Candidate School, Army Air Forces Technical Training Command, Miami Beach, Florida, 23 September 1942, prescribes twenty hours of instruction in leadership, including psychological principles, empirical principles of conduct and practice in effective speaking before large and small groups.

(4) Command and General Staff School Regular Course, 1932-1933 and 1933-34, provides a series of four lectures on leadership during the two-year course. Schedules for Special Staff Courses, 1940-41, provide a one hour lecture on leadership. No instruction in leadership was scheduled for General Staff Classes during the war years.

Recommended Plan

Civil Life

1. Character is a prerequisite of leadership, and the greatest influence on character is environment, particularly during the younger years of a man's life. The raw product coming into the army, who is to be developed into a leader, should possess character upon entry, for there is not sufficient time in the army during war completely to develop character.

2. The greatest influences in society on the environment of the young man are: the home, the school, the church, various character building organizations, the press, the radio, and motion pictures.

3. The committee therefore recommends that the War Department, acting through the Federal Government, foster by every practicable means a character building program in the interest of national security for the purpose of improving the raw products from which, in the event of a national emergency, army leaders must be developed.

4. The committee suggests the following means of carrying out the above recommendations:

a. Acting through the National Board of Education to: (1) Foster the establishment of a working "honor system" in all grammar, high and preparatory schools, and in higher institutions of learning. In many schools, colleges, and universities such systems exist now in name but not in fact.

(2) Foster greater discipline in our entire school and college systems. As a prerequisite it is essential to increase the teacher-student ratio. Greater care should be exercised in the selection of teachers. In order to attract competent personnel in these all-important positions of molding character, substantial salaries must be paid. This profession at present, when considering its educational requirements and its influence upon our national character, is one of the most, if not *the most* underpaid professions in our country.

(3) Foster greater sense of responsibility and obligation on the part of the individual throughout our entire school system by:

(a) Causing the individual to accept increasing responsibilities in his every-day school life and activities.

(b) Acquainting the individual with his

obligations to his country, to his fellow man, and to society in general.

(c) Ruthlessly weeding out of our public school system and our colleges and universities instructors who are preaching treasonable doctrines, and fostering instead the type of instructor who will teach the virtue of patriotism.

(4) Foster greater athletic programs, particularly in our rural schools. This, for the purpose of instilling in the individual the "will" or the "fighting spirit" so essential to a soldier or a leader in time of great crisis.

(5) The introduction of a compulsory course of instruction in the basic principles of applied psychology in all high schools and for all undergraduates in all colleges and universities.

(6) The encouragement of the teaching, in our schools, of ethics and moral philosophy as differentiated from religious denominationalism.

b. Reviewing present legislation and encouraging more rigid legislation, where necessary, with a view toward: (1) Restricting the employment of mothers where such employment might lead to juvenile delinquency by virtue of her continued absence from her home and family.

(2) Holding parents of juvenile delinquents liable where neglect on the part of the parents is proved to have contributed to the delinquency.

(3) National child labor laws.

(4) National compulsory education through the completion of high school or until 18 years of age.

c. Federal subsidy and greater encouragement to such character building organizations as the Boy Scouts of America, 4-H Clubs, and the YMCA.

d. Federal encouragement, acting through the churches and through the Association of Editors, to clean up the press, eliminating by public opinion such things as "scandal sheets" and giving greater space to character building activities and youth programs.

e. Greater censorship upon the motion picture industry with the aim of stressing to a greater degree character building and to deglamorize crime.

f. Federal subsidies for the filming and showing to youths in schools, churches, or character building organizations, motion pictures stressing character building.

g. A national "better housing" program designed to eliminate our slum districts, and "shanty town" areas, and to provide every family with an abode that will enhance its self-respect.

h. Establishment of a youth program similar to our former CCC. This program to be designed on the basis of a flexible quota for the purpose of "taking up the slack" in youth unemployment and to employ such otherwise unoccupied youth along gainful character building lines.

Pre-Commission Training

5. In pre-commission schools, where men from civilian status come for the first time under military control, training in leadership must be given sufficient weight so that it is treated as a subject in itself. Sufficient emphasis must be given to developing officers with high leadership qualities and proficiency in the techniques of instructing in leadership so that the wartime depletion of our officers' corps will not so materially affect the standard of leadership in our army as it did in the past war.

6. The committee recommends that in all pre-commission schools the subject of leadership be included in the program of each school year, as a distinct and separate subject. The scope should include a development of the fundamental principles of psychology in order more comprehensively to teach leadership. It is believed that the fundamental approach to understanding the art of management of men should be made by instruction in the basic

principles of applied psychology rather than by instruction in empirical do's and dont's.

7. The committee further recommends that the development of character be a prime objective at pre-commissioned schools. It is believed that a strict "honor system" and a great stress on devotion to duty, as practiced by the United States Military Academy are indispensable to molding character. This practice should be stressed in all pre-commission schools by all means available to the War Department and the faculty. Candidates for commission whose honor and devotion to duty are not satisfactory should not be commissioned regardless of their academic grades.

8. Finally, the committee recommends more opportunity for practical application of the theoretical knowledge the students may acquire in leadership during pre-commission training. In all schools there should be a greater realization that the best way to train leaders is to give them an opportunity to lead men. A system of rotation can be involved; although it may detract from the unit drill efficiency in showmanship effectiveness, such detraction will be slight, and the advantage of giving all students an opportunity to lead will increase the over-all efficiency of the newly commissioned officers each year.

Officers' Schools and Unit Training

Officers' Schools

9. In considering courses to be given in officers' schools, the committee assumes that the plan of the "War Department Military Education Board on Education System for Officers of the Army" will be adopted substantially as recommended and also that the recommendations of the committee for instruction in pre-commission schools will have been put into effect.

a. Branch Basic Officer Schools:—The student will have recently completed a course of instruction at a pre-commission school, but will lack practice in applied leadership. It is therefore recommended that the instruction consist of:

(1) A brief review of elementary applied psychology.

(2) A brief review of principles of a leader's conduct.

(3) Required reading of at least two standard works on leadership, a written analysis of each (2000 words is suggested) and oral presentation to the class of several of the better analyses.

(4) Applicatory exercises in voice and command, troop leading drill, officer-enlisted man relationships either within a company, battery, or troop, and oral instruction of groups in selected military subjects.

b. Branch Advanced Officer Schools:—Students will have had from four to ten years practical experience and a corresponding time in which to forget theory. At this level and higher, instruction should be by individual and committee study and presentation rather than by lecture or applicatory exercise. The committee recommends:

(1) Study of applied psychology.

(2) Class discussions on principles of conduct, utilizing personal experience of students.

(3) Study, report and oral presentation of various aspects of command and leadership, including a brief study of the qualities required for mass leadership.

(4) Practice in public speaking by oral presentations of subjects selected from the entire curriculum of the school.

c. Command and Staff College:—The committee believes that the analytical study of mass leadership should begin at this level. It recommends that the course consist of:

(1) A broadening and extension of instruction recommended for Branch Advanced Schools.

(2) Committee studies of mass leadership, both in the abstract and as evidenced

by present or former leaders, civilian and military.

(3) A study of ethics as a national progression from the practical character training of earlier schools.

d. Armed Forces Institute:—(1) Practice in poise and platform presence by oral presentations to the group.

(2) Committee studies of methods of impressing the personality of the mass leader on the mass.

(3) A progressive study of ethics.

e. National War College:—(1) A study of applied mass psychology.

(2) Critical studies of existing faults in leadership and methods of improvement.

(3) A progressive study of ethics.

f. Associate and Extension Courses:—The committee recommends that the above program be included in the associate and extension courses of the appropriate schools in abbreviated form.

Unit Training

10 *a. Recruit Training:*—The committee believes that recruits should receive a less hurried and more thorough course of indoctrination in order that they may better understand the army and their place in it. Such a course would result in more cooperative discipline and provide a better foundation for the recruit who is prospective NCO material. The committee recommends that, during the basic training period, training time be allotted for personal adjustment instruction, for detailed explanation of the character and need of military discipline and of officer-enlisted man relationship, and for indoctrination with pride in the army and in the unit.

b. Pre-NCO Schools:—It is recommended that prospective NCOs be given a course in leadership, prior to temporary appointment, utilizing subject schedule No. 90, The Infantry School, "Program for Noncommissioned Officers' Schools in Infantry Regiments" or a course of equivalent scope.

c. NCO Schools:—It is recommended that temporary NCOs be required to complete a course in leadership before receiving permanent warrants. This course should be approximately twice the length of that required for pre-NCO training. It should consist of a review of the theory taught in the pre-NCO courses, and of applicatory exercises.

11. Leadership Training in wartime.

Wartime changes in national thinking, especially within an army, suddenly charged with the prosecution of a global war, cause a shift of emphasis from perfection to speed, from training to mere instruction, from orderly plan to expediency. It is recognized that short cuts will always be necessary, but the danger lies in the tendency in wartime to take essentials for granted with the result that they are neglected or omitted altogether. The personnel of a peacetime army will understand the relative importance of leadership, discipline, and other military intangibles and these subjects will not usually be neglected. However, the civilian personnel coming into the army during war cannot be expected to possess the same military values. The committee believes that in wartime, training in leadership and its allied subject of discipline remain all-important in an army. It is therefore recommended that the War Department guard against the wartime tendency to minimize those subjects on the excuse that they are intangibles for which there is no time in a wartime training program. Many of these intangibles can be taught indirectly during off duty hours by proper supervision demanding a high standard of honor and discipline.

12. The quality of leadership in wartime, diluted as it is by overwhelming numbers of incoming civilians who have at best an imperfect conception of the duties of an officer, must be preserved by firm direction from above. Unless direct support of those intangibles which

go to make up discipline and leadership emanates clearly and directly from the highest authority they will become lost or at least distorted beyond recognition by the weight of collective opinion of the incoming citizen officer. There should of course, be no objection to progressive changes of customs of the service or traditions no longer serving any useful purpose, but changes which attack discipline or leadership must not be permitted. Such changes can only be avoided by intense and positive action on the highest levels in support of those officers charged with maintaining discipline and leadership in the field. It is therefore recommended that the War Department, as a part of any mobilization program, incorporate this policy in a direct and positive manner.

13. It is further recommended that wartime training be a condensation of the training in peacetime, with change in emphasis from theoretical to practical training in (1) human relations, (2) the actual handling of men individually and collectively, formally and informally, in and out of military formations, and (3) in the use of the voice as the most usual means of expression for the junior officer or small group leader. Training in practical leadership should be combined with practice in public speaking wherever possible.

14. Finally, the committee believes that the system of training under which the embryo lives for twenty-four hours per day is more important to leadership than any other one factor, because it builds character, an indispensable quality in leadership. It is recognized that there is no substitute for time in training, especially during war, but it is believed that intensity is the only near substitute. Character is so indispensable in the officer or soldier that we cannot afford not to try as well as we can in war to build it, even though there may seem to be too little time for an effective program in so doing. What time there is must be used to the best advantage in character building; and the *system* rather than the curriculum itself, will be the decisive factor in character building and, therefore, in leadership training. Consequently, it is recommended that the War Department establish in all wartime officer training schools a system of training which will insure development within the officer of the ideals of devotion to duty and unalterable personal and professional integrity.

A proper posture of defense is both a deterrent to aggression and an insurance for peace.

General of the Armies John J. Pershing

The Army Goes Overseas

Major J. W. Holman, *Transportation Corps*
Instructor, Command and Staff College

The Problem

AT the close of World War I the army looked back upon completion of the most stupendous movement of personnel and supplies in military history. Over 2,059,000 military passengers had been moved to overseas destinations through United States ports in the years 1917-18. True, these soldiers had obtained about half their supplies and equipment from allied sources in the theater of operations, and had been lifted overseas largely in vessels of allied registry; yet approximately 5,000,000 long tons of military cargo were shipped from the United States to back up the American soldier in action. Alert individuals, however, had noted long lines of railroad cars on sidings en route to port areas. This was caused by the well meant rushing of supplies to the ports by shipping agencies regardless of the relative importance of shipped items, and without reference to the ability of the port to send the cargo on its way to the waiting troops. This resulted in congestion along the rail lines leading to the port areas with a consequent impairment, during certain critical periods of the most effective use of the newly born but mighty industrial capacity of the nation.

Shipping had not been efficiently used, and with poor documentation of carried cargo, the result was the loss or misplacement of thousands of tons of badly needed supplies somewhere in the lines of communications.

It is doubtful if any mind, however keenly attuned to the principles governing military transportation as emphasized in the first great war, foresaw that those principles would be put to the acid test in another war in which over 7,290,000 military passengers would be transported to their respective theaters of war over such long water distances as they were in World War II. Nor could anyone have foreseen that because of increased demand for mobility and greater exploitation of firepower in World War II it would be necessary to ship more than five tons of equipment and supplies overseas along with each soldier, and that approximately one ton each month must follow to maintain him in battle against the enemy. No logistical soothsayer could have been found to prophesy that in the fulfillment of this mission the east coast ports of this country alone would have to deliver in the *three months* of February, March, and April 1945, more supplies to our advancing armies in Europe than were shipped to General Pershing's forces during *all of World War I.* How, then, was this accomplished?

The Solution

On 7 December 1941 there were in operation in this country three Army ports of embarkation: New York, San Francisco, and New Orleans. Charleston, Hampton

Roads, and Boston had been authorized as subports of New York and were placed in operation shortly after we entered the war. The San Francisco port operated a subport in Los Angeles after the outbreak of hostilities. Control of these ports was a responsibility of the transportation Corps after a reorganization in March 1942. The Transportation Corps operated the ports of embarkation as Class IV installations throughout the remainder of the war.

The Charleston, Hampton Roads, Boston, and Los Angeles subports of embarkation became ports of embarkation, and with the addition of certain subports, temporary subports and cargo ports (see Figure 1) received, processed, and loaded aboard vessels approximately 60,000,000 long tons of cargo for discharge at 330 ports and beaches scattered over most of the world's surface.

Each port of embarkation was assigned primary supply responsibility for specific theaters or bases. In the event the supplies requested by a theater became too great to be forwarded through the primary port, or if available shipping was more efficiently disposed for loading at another port, that port might be directed to act as agent or "outport" for the primary port for the handling of designated cargo. The original port remained in each case primarily responsible for the supply of the theater. This method provided flexibility in the operation of available water transport which was highly necessary, and made it possible for the primary port, in planning of shipment of personnel and supplies and directing their movement to the ports best able to forward them, to consider the various supply sources, shipping availability, and local port situations.

To utilize the civilian transportation facilities to best advantage within this country, it was deemed wise to leave them under control of their own operating facilities. This made necessary close coordination between the carriers, civilian governmental transportation agencies, and the Transportation Corps acting as traffic manager for the War Department.

At the time of our entry into the war it was recognized that two prime needs for efficient operation of the nation's transportation were: (1) the need for economy in use of equipment and transportation services; and (2) a system for the over-all control of traffic flow to the ports. An agency known as the Office of Defense Transportation, possessing broad regulatory authority, was created; and assisted by the army's own regulatory machinery already in operation, it performed efficiently the manifold functions involved in a centralized control of movement of commercial and military shipments.

It should be noted that credit for much of the successful use of the transportation capacities of the country must go to the railroad industry itself. Carrier organizations cooperated closely at all times. For example the Association of American Railroads—the organization of the principal railroads of the United States, Mexico and Canada—established its Military Transporation Section in the Pentagon Building, to work in close conjunction with the Office of the Chief of Transportation. It provided, on behalf of the railroads, assistance and advice in movements of troops and supplies and received information as to contemplated transportation requirements, from the Office of the Chief of Transportation. It secured routings and schedules, allocated equipment, and followed each military rail movement from origin to destination thus assuring the desired close control of movements.

It was this cooperation and coordination which made it possible to increase the number of revenue passenger-miles from

HALIFAX
Sub-Port of Boston
SEARSPORT
Sub-Port of Boston
BOSTON
NEW YORK
PHILADELPHIA
(Cargo Port)
HAMPTON ROADS
EDMONTON, ALBERTA
PRINCE RUPERT, B. C.
JUNEAU, ALASKA
EXCURSION, INLET
SEATTLE
Tacoma Br.
AUBURN
SPOKANE
PASCO
PORTLAND
LATHROP
OAKLAND
SAN FRANCISCO
LOS ANGELES
YERMO
OGDEN
SALT LAKE CITY
VOORHEESVILLE
ELMIRA
MARIETTA
BALTIMORE
(Cargo Port)
RICHMOND
CHICAGO
COLUMBUS
ST. LOUIS
OMAHA
ALBUQUERQUE
EL PASO
SHREVEPORT
DALLAS
SAN ANTONIO
ATLANTA
CHARLESTON
MONTGOMERY
NEW ORLEANS
I
II
III
IV
V
VI
VII
VIII
IX
LEGEND
Port of Embarkation
Sub-Port of Embarkation
Cargo Port of Embarkation
Zone Transportation Office Hqrs
Holding and Reconsignment Point
Regulating Stations
Consolidating Stations (Army and Navy)
Army and Navy Distributing Agency

Figure 1.

American railroads handled an unprecedented volume of freight.

22,651,000,000 in 1939 to 95,549,000,000 in 1944, and to advance revenue freight ton-miles from 333,438,000,000 to 737,246,000,000 in the same years. This was done with only a slight increase in the totals of operating equipment available for use. While the need for additional motive power and equipment had been foreseen befor Pearl Harbor, little action had been taken to remedy potential shortages. This meant that, following entry into war, little could be done to increase the rolling stock without effecting a corresponding decrease in the amounts of purely military supplies which were even more badly needed.

Development of highway and air networks had brought the airline, bus, and trucking industries in wide use, and coordination of these means of movement with inland waterways and coastal barge shipping, together with the development of pipe lines to transport petroleum products, afforded relief to the railways and served to increase flexibility of the national transport systems.

A system of regulation was already in operation whereby all organized groups of forty or more men moving on War Department orders were routed by the War Department. Transportation officers at point of origin routed groups of personnel of less than forty. All groups of fifteen or more traveling by rail were given original routings by the territorial passenger associations of the railroads involved. These routings were so handled as to divide the traffic equitably among the railroads without exceeding emergency capacity of any line.

In the forty-five months of the war 324,891,000 short tons of freight moved on War Department Bills of Lading. Peak freight movement of the war in March, 1945 saw 11,001,000 short tons of supplies moved in the Zone of Interior. All carload shipments were routed by the Of-

fice of the Chief of Transportation. Less than carload shipments were routed by the transportation officers at points of origin except for that substantial part of such shipments which was sent to Army and Navy Consolidating Stations (see Figure 1) for grouping into carload lots bound for specified destination areas served by an Army and Navy Distributing Agency. Resultant savings in equipment and charges were of tremendous significance.

The controls discussed above were of specific value as they were applied following the spring of 1942 to the problem of maintaining fluid traffic conditions

The Pasco Holding and Reconsignment Point as seen from the air.

within the port areas. In addition a dual control system composed of block releases and unit permits were set up. A Transportation Control Committee having Army, Navy, Office of Defense Transportation, War Shipping Administration, and British Ministry of War Transport representation was established with an executive staff furnished by the Office of the Chief of Transportation. This committee issued block releases in the amount of the tonnage to be shipped to each port within a given month. It was empowered to change tonnage amounts and divert or delay shipments as made necessary by situation changes. Within the amount of the block release authorizations the Army, Navy, and War Shipping Administration (for commercial shipments) were authorized to issue unit permits for export freight shipments.

The port commanders were charged with maintaining the flow of supplies and personnel into and out of the ports. When movement orders on a unit destined for overseas service were received by the port selected to accomplish shipment, and after tentative allocation of shipping space for the unit and ascertaining that there was available staging area space for personnel involved at the proper time, the port commander called forward the unit or units involved. No movement into a port area could proceed lacking such authorization. To permit flexibility in handling of freight movements and to assure that there would be on hand cargo in sufficient quantities to utilize available ship space, holding and reconsignment points were constructed within twenty-four hours rail distance from the ports (see Figure 1). These furnished open and covered transit storage space, relieved the ports of acting as a storage dock and furnished opportunity for assembly of shipments meant for loading as a unit. A holding and reconsignment point normally furnished over 1,000,000 square feet of closed storage space and averaged approximately 4,000,000 square feet for open storage.

Before other battles might be fought and won, the battle to move men, their equipment and the supplies to maintain them in action over all the world's surface had to be played out. This meant that at the height of the army's ocean shipping effort, 1,706 vessels of 15,940,000 deadweight tons were sailing in army service. Miracles of construction effort had been accomplished in shipyards scattered along all the coastlines of the country. Our merchant fleet had sprung from 11,600,000 deadweight tons to about 54,000,000 deadweight tons. Over 6,000,000 deadweight tons of ships had been sunk by the action of an enemy determined to break the lifeline of the United Nations.

Ships had to be loaded with unwonted speed, yet as carefully as possible to prevent cargo damage. Unheard of types of loads were developed such as "block loads" in which the ship became a storehouse containing specified quantities of specified items, and with a complete convoy of such ships carefully loaded becoming a floating base for an overseas military operation. Vessels were "combat loaded" when troops and equipment were so embarked as to debark at the destination in the tactical order desired and ready to fight. Unusual cargoes were carried: birdseed for Signal Corps pigeons, huge bombs, aircraft, railroad engines, gasoline, tanks, and trucks.

Aircraft began to assume a new role. Long range planes were ferried over the ocean thus saving shipping space, and cargo planes began to carry urgent items of freight to the battle areas. A new concept of movement and supply of field troops, linked to the mobility, flexibility and speed of the airplane stirred in the minds of logisticians, and as always the military planner looked to the solutions of the past for a key to the answer for the future.

Legislation *and the* New Army

Reprinted from the "Army Information Digest" February 1947.

It is the duty of every officer to become familiar with the proposals for military legislation before the Congress, now and as they develop; and to use every proper opportunity to present the facts to the public. It is equally the responsibility of every commander to keep his troops informed, and to make sure that every soldier understands what the Army of the future will be, and what role he will play in it.

J. LAWTON COLLINS
Lt. Gen., US Army
Chief of Public Information
War Department *

The Overall Program

OUT of forty-eight War Department-sponsored bills submitted to the 79th Congress, thirty-three were enacted. Among those which failed to pass were such vitally important measures as Unification of the Armed Forces, Universal Military Training, and Retirement and Elimination of Officers.

The most important lesson to be learned from these failures is that the legislative program as a whole was based on a piecemeal plan and was defeated in detail. Repeatedly, during Congressional hearings, the War Department was asked to explain the relation of individual bills to partially completed overall plans. Consequently, it was determined that the entire military legislative program to be presented to the 80th Congress must be fully coordinated and planned in advance; and that questions, which for one reason or another could not be answered previously, must be fully resolved before presenting a program to the Congress and the public again.

Based on War Department experience in the 79th Congress, it was decided that all bills affecting the military policy of the United States should be organized into two major groupings:

1. The National Security Program, covering that part of the overall military program which transcends purely War Department interests and vitally affects other executive departments and our entire civil economy, such as Unification of the Armed Forces, and Universal Military Training.

2. The War Department's Program for a Postwar Military Establishment, covering Army and Air interests.

It was also decided to achieve in advance the fullest possible coordination and singleness of purpose among the top levels in the War and Navy Departments, the Bureau of the Budget, and the Congressional leaders. The War Department, furthermore, is seeking the fullest practicable coordination with veterans' associations and civilian components of the Army, finally, of course, it is necessary to achieve full public understanding through an adequate information program.

* Extracted from the foreword to this article.

TENTATIVE LEGISLATIVE PROGRAM FOR THE 80TH CONGRESS

A. The National Security Program:

1. Unification of the Armed Forces.
2. Universal Military Training.
3. International Military Cooperation Measures.

B. The War Department Program for the Postwar Military Establishment:

1. ORGANIZATION:
   - *a.* Title I Army.
   - *b.* Title II Air Force.
   - *c.* Title III NG.
   - *d.* Title IV ORC.
   - *e.* Title V Common Overhead and Services.
2. PERSONNEL:
   - *a.* Title I Strengths.
   - *b.* Title II Promotions, Retirement and Elimination.
   - *c.* Title III Pay and Allowances.
   - *d.* Title IV Procurement of Personnel.
3. MILITARY JUSTICE:

   (Revision of Articles of War and Manual for Courts-Martial.)
4. RESEARCH AND DEVELOPMENT.
5. PERMANENT SUPPLY AND SERVICES:
   - *a.* Title I Procurement.
   - *b.* Title II Permanent Construction.
   - *c.* Title III Maintenance and Other Services.
   - *d.* Title IV Disposal of Property.
6. CURRENT OPERATIONS.

The National Security Program includes measures to which the President gave his approval in the past session of Congress. The first two measures—Unification and Universal Military Training—were specifically included in his message to that Congress.

In his message to the 80th Congress, the President again presented those measures, recommending that a bill for unification of the armed forces be given early consideration. Because of manpower implications, which will be discussed later, he also asked for high priority on consideration of a possible extension of the Selective Service Act. The high priority on unification is obviously of key importance to the remainder of the War Department's legislative program. All bills on the Postwar Military Establishment (the War Department's program) have been prepared, necessarily, on the asumption that the unification bill will be considered by the Congress first, and will be favorably acted on, before other measures are enacted. For example, separate legislation must be prepared for the Army and Air components under any unification bill which may be passed.

Measures included in the War Department's Program for the Postwar Military Establishment may be classified under six broad headings, as shown on the chart above. Each may be broken down into titles which will be applicable to narrower subjects, which can be submitted and enacted separately, at the discretion of the Congress. In addition to these bills, designed to implement broad selections of the overall plan and to establish more or less permanent organization and procedures, there are, of course, the annual appropriation and deficiency bills.

It is difficult to imagine the profound,

chaotic effect of returning the Army to a peacetime status under legislation now on the books, if the wartime directives should be abolished by putting an end to the President's emergency powers. The Army would return overnight to a strength of 162,000 men; the Army Air Forces would go out of existence; most of the Army's important installations would be closed; all occupation troops would have to be returned; and all temporary ranks would be abolished.

The total effect of the current War Department legislative program—planned and projected—will be to recodify the military laws of the United States. So far as it is practicable, these bills will specifically repeal all previous statutes on the subjects to which they pertain, reenacting in identical language those which require no amendment. That is the goal, although the time element will doubtless prevent complete codification in the first session of the 80th Congress. The program involves more than a rewriting of the National Defense Act. It furnishes the basis for an effective, modern military establishment—one that can protect our Nation and its commitments in any emergency in the foreseeable future. The program is flexible and adaptable. All bills are drafted in phraseology as broad as possible, leaving the maximum practicable administrative discretion to the President and to the Secretaries of National Defense, Army, Navy, and Air.

As is well known, dollars will be the ultimate controlling factor in effecting real national security. The people and the Congress will not approve adequate enabling legislation, or what is more important, adequate annual appropriations, unless they are convinced that the nature and degree of possible threats to the national security warrant the necessary grants of authority and dollars to "the military." However alarmed the military may be by the facts of the present world situation, their judgment and motives may be suspect on the basis of alleged jingoism. We can plan and ask honestly; but in the last analysis, our fate and the Country's fate depend on how well and accurately the facts are gathered, presented, and understood. The presentation of these facts is necessarily largely out of military hands and within the hands of the State Department and other civilian agencies of the Government. If some plan for informing the public of the true international situation is effective, the armed forces may be assured the necessary men and money to insure the national security. Without adequate public support, the armed forces will not get the necessary money to establish a sound military structure; and our future security may again rest on the gamble of whether or not the people will become alarmed enough in time enough.

Postwar Military Establishment

The problem faced in planning for the Postwar Military Establishment is the translation of the world situation into a military policy; a conversion of that policy into specific basic tasks; and finally the determination of the amount of men, money, and resources required to carry out those tasks.

Our military policy is best expressed in the broad mission of the armed forces:

1. To participate, as directed, in international programs for preserving world peace and security.

2. To maintain the ability to take swift counteroffensive action, if necessary, in support of the United States' position in world councils.

3. To provide for security of the United States in case of failure of world peace programs.

These broad missions are subdivided into the following basic tasks of the Army:

a. Participation in the occupation and

in the civil and economic rehabilitation of Germany and Japan.

b. Maintenance of forces in the United States to support occupation.

c. Provision of the United States component of the United Nations Security Force.

d. Maintenance of a system of bases.

e. Development and maintenance of an efficient intelligence organization.

f. Maintenance of supremacy in research and development.

g. Provision of mobile striking forces-in-being, to attack key installations or to seize and occupy areas vital to any aggressor nation.

h. Provision of adequately trained reserves, to augment forces required for immediate action in the event of war.

i. Provision for civil defense.

j. Provision for rapid total mobilization of all national resources for final decisive action.

Clearly, the primary task of the Army at this time is occupation. Last Spring, Secretary of War Patterson and General Eisenhower told the Senate Military Affairs Committee than an Army of 1,070,000 effectives would be required on 1 July 1947, and thereafter for as long as we have occupation forces overseas. This figure was based upon certain assumptions:

1. That the occupation is peaceful;

2. That the Allies share the occupation responsibility;

3. That we have continued use of prisoners of war and foreign nationals, according to plan;

4. That disposal of surplus property is expedited;

5. That peace treaties are consummated; and

6. That the United Nations organization is effective.

Failure to meet any of these conditions imposes an added task on the Army, for which additional strength is required. For example, we now have 28,000 troops in Italy and 13,000 in Austria—allocations which were not included as a part of the 1,070,000-man plan.

Although the War Department does not consider that war is inevitable, it does recognize that fundamental conflicts of purpose still exist between great military powers, and that a major conflict can occur at any time in the future. We must plan on the basis of the capabilities of potential aggressor nations rather than on estimates of probable intention. In sober consideration of this factor, the War Department has arrived at certain conclusions.

We must constantly maintain efficient forces-in-being, while at the same time we have the plans, the organization, and the resources to meet emergency requirements. Plans for the *peacetime* Army must be made in the light of plans for the *occupation* Army and the *mobilization* Army, and must be integrated with those plans. In addition, Army plans must be integrated with the plans and operations of the Navy. In the absence of unification, such integration would prove increasingly difficult.

If we prepare for war, we must prepare for a total war. It has for some time been an accepted assumption that the next war will come with a heavy surprise attack. Such an attack would be designed to destroy or paralyze our abilities, in order to force a quick surrender. On the other hand, the enemy might choose to forego the advantages of surprise in order, first, to gain closer bases and a more favorable position by efforts other than military. Whatever enemy strategy is actually adopted, we must be prepared for a devastating initial attack.

With this prospect for a Pearl Harbor infinitely more staggering than the original, it becomes imperative that the Army maintain at all times a close liaison with industry, and that the Nation's in-

dustrial potential be kept up-to-date in all planning. At best, it takes years in peacetime to develop a vital weapon, from the pilot model to the hands of troops trained in its use. Avoiding a future Pearl Harbor may mean firing the first shot on the production line as much as three years before the first bomb hits us. It is estimated that, within the next year or so, atomic warfare, guided missiles, biological warfare, and extended capabilities of air power will bring about changes in the composition and equipment of our forces, as well as in our strategy. If we once lose the lead in the development of new weapons, those same weapons in the hands of the enemy may prevent us from ever regaining our position.

Total war calls for total mobilization. According to the present program, the War Department plans to attain a total of five and one-half million men as the first mobilization target. As a further mobilization target, it is planned to have eight million men under military control at the end of the second period.

While the composition and the functions of the ground, sea, and air team will undoubtedly be modified to meet future developments, especially in science, there is nothing at this time which indicates a major change in the requirements for any of the services, in case war comes in the foreseeable future. The increased tempo of war and the advent of new weapons has increased the importance of maintaining balanced armed forces in a state of complete readiness—forces capable of holding bases; maintaining communications with them; retaining control of strategic land, air, and sea bases; providing immediate defense against air and surface attacks; organizing offensive action by striking forces; and seizing and occupying the sources of attack.

Finally, a major concern in both defensive and offensive planning must be adequate provision for combating fifth-column activity. Sabotage, subversion, strikes, and civil unrest can disrupt mobilization, home defense measures, and ultimately the overall war effort. The urgent need for disciplined civilian groups, to bring order out of the local chaos created by atomic attacks, dictates the absolute necessity for a completely efficient civilian defense organization. It is questionable, however, whether such an organization can be prepared in peacetime, capable of meeting the initial peak load of an emergency. Hence, it must be assumed that part of this load will fall on the armed forces, with a consequent increase in military requirements or a retardation in mobilization.

Army Manpower Requirements

In considering our military manpower requirements, it is not enough to think only in terms of the Regular Army. One of our main objectives must be to develop, rapidly, an effective National Guard and Organized Reserve Corps. An M-day *force-in-being* of approximately 1,750,000 men is necessary (M-day representing the day on which we are attacked or on which hostilities are declared to exist). At present there is no semblance of an effective National Guard or Organized Reserve Corps, and it is increasingly evident that it will be difficult to maintain an effective Regular Army of even 1,070,000 men during the period of occupation. Consequently, we find ourselves critically short of the forces needed to meet any crisis.

The Regular Army within the continental limits of the United States is barely adequate for its job of serving our overseas forces and maintaining a very small general reserve. If we were plunged into war, we would have neither the force necessary to control emergency situations in critical industrial areas that might be attacked through the air, nor sufficient troops to prevent even elementary sabotage at critical points in our industrial, trans-

SUMMARY OF MANPOWER REQUIREMENTS

POSTWAR ARMY

M-day Immediate Effectives

875,000 RA, all (see footnote).
680,000 NG, all.
195,000 ORC, part.

1,750,000 Total effective force on day hostilities begin.

M-day Organized Manpower

875,000 RA, all.
680,000 NG, all.
876,000 ORC, including 195,000 immediate effectives.

2,431,000 Total effectives.

M-day Plus 1 Year
(Trained Manpower)

875,000 RA, all.
680,000 NG, all.
195,000 ORC, immediate effectives.
3,750,000 Balance ORC; draft.

5,500,000 Manpower pool, first year.

NOTE: Add 195,000 to RA, making total 1,070,000—"Interim Army," during occupation.

Factors militating against M-day force, fiscal year 1948:

a. UMT trainers, 134,000 additional troops (assuming adoption of UMT).
b. Replacements for anticipated losses during year ..... 400,000.
c. NG and ORC shortages.

portation, and communications systems. Hence the mobilization ability of the civilian components is a matter of primary concern to the War Department and to the Nation.

Analyzing our needs, we list first a postwar Regular Army of 875,000, including ten divisions and seventy air groups. (Additional requirements for occupation forces have added 195,000, giving us the 1,070,000-man Army, often referred to as the "Interim Army.") Next, we need a National Guard of 680,000—three times the strength of the pre-war Guard—containing twenty-seven divisions, twenty-seven air groups, and various other elements, immediately available on M-day. Finally, we need an Organized Reserve Corps of around 876,000 men in units (twenty-five divisions and thirty-eight air groups), of which 195,000 would be Class A (fully organized) units, immediately available on M-day. These three elements—Regular Army of 875,000; National Guard of 680,000; and 195,000 from Organized Reserve Corps units—will total 1,750,000 troops, completely organized, trained, and equipped, ready for immediate commitment. At full strength—that is, including the entire Organized Reserve Corps of

876,000—the force of the three major components of the Army of the United States will total approximately 2,500,000.

However, our ability to organize a total of 1,750,000 M-day effectives is doubtful for the fiscal year 1948. The following factors militate against reaching this goal:

(1) 134,000 additional troops will be needed as a cadre for Universal Military Training, assuming the adoption of UMT.

(2) Roughly 400,000 enlistees and reenlistees will be needed as replacement for losses during the year.

(3) Shortages due to the inability of the National Guard and Organized Reserve Corps to meet M-day requirements are anticipated.

Assuming, however, that a total of 1,750,000 M-day effectives (Regular Army, National Guard, and Organized Reserve Corps) would be available, an augmentation pool of 3,750,000 additional trained men would be necessary (1) to bring the various components up to full strength, (2) to provide for replacements, and (3) to provide for wartime expansion during the first year of hostilities. This augmentation of 3,750,000 would include the Organized Reserve Corps and men received through some form of compulsory service. In short, total requirements for trained military manpower during the first year of hostilities, assuming that our current military obligations continue, would be 5,500,000 men.

What can be done to meet these manpower requirements?

Due to age and other factors, the number of available war-trained veterans is expected to dwindle rapidly. Even from this reservoir, men are not now responding in sufficient numbers to meet the requirements of the National Guard and the Organized Reserve Corps. The National Guard probably can be recruited to only about fifty per cent of its authorized strength of 680,000 without the aid of Universal Military Training, or some type of compulsory service, or greatly increased benefits. The Organized Reserve Corps likewise will suffer. It is important that the service-type units in the Organized Reserve Corps—units not normally found in the National Guard—be fully manned, to the extent of some 200,000 men during peacetime, as a component of a balanced M-day force. But not more than 50,000 can be expected to enroll under a volunteer system which provides no emoluments of any kind. With drill pay, the requirements might be met; not only for service-type units, but for all types of Organized Reserve Corps units. But only with Universal Military Training, or with some form of compulsory service, can the National Guard and Organized Reserve Corps be organized and maintained at full strength.

Regular Army enlistments have been gratifying, but despite the best recruiting record that any Army has ever attained, the total number of enlistments is less than required, and is continually decreasing. It is expected that the strength of the Regular Army through volunteer enlistments will decline within the next two or three years to possibly 600,000. A continuation of Selective Service, or some form of compulsory military training, therefore, is essential to the maintenance of a million-man Army.

Procurement of officers presents no serious problem. The 50,000-officer limit for the Regular Army will be reached without difficulty; and there has been generous response from National Guard and Reserve officers to the request that they stay on extended active duty. To those officers who stay on duty for longer periods, the Government should grant some gratuity, either upon completion of service, or upon earlier release. No difficulty is anticipated in securing the necessary number of officers for the National Guard. With respect to officers for the Organized Reserve

Corps, however, experience shows that a shortage will exist after a few years, particularly in the junior grades. Unless drill pay, allowances, or some other incentive is provided, it probably never will be possible to secure enough Reserve Officers to make *any* training effective. The commissioning of 100,000 Reserve Officers yearly is the goal which should be sought by the Army. A small proportion of these would be commissioned in the Regular Army; many thousands would be required for extended active duty with the Army, as far in the future as can be foreseen; other thousands would be needed in Reserve units.

While more than 500,000 three-year enlistees have been recruited to date, nearly half of these are in the Army Air Forces. The picture, so far as the ground arms are concerned, particularly the Infantry, is not at all bright. By 31 December 1946, the Pacific theater had suffered nearly a 100 per cent manpower turnover; and at present less than one-fourth of the ground troops in that theater are three-year enlistees.

Long-term enlistments are not only much more desirable, they are far more economical. When a newly-enlisted man has to be trained and transported overseas, the time lost in processing, training, unavoidable delays, and terminal leave reduces by as much as nine months the soldier's period of service on duty with a unit or in a productive job. It costs about $3,000 a year to pay, feed, clothe, and care for a soldier; and the corresponding cost for an 18-months enlistment, therefore is $4,500. Divided by nine months of productive employment, the cost is $500 per month. Adding the cost of providing benefits for each of these soldier's under the various veterans' services increases the amount by about $4,500 more, making a total of $9,000. Consequently, the 18-months enlistee costs the tax-payer about $1,000 for each month of useful service. The three-year enlistee, on the other hand, even in his original enlistment period, has twenty-seven useful months of service, thereby decreasing the monthly cost considerably. Furthermore, short-term service frequently puts two veterans on the public payroll, compared with one veteran whose service is three years. The advantages to be gained by long-term enlistment are clearly apparent.

The postwar Army must not only sustain the Reserve components and provide a small mobile force; it must also furnish the nucleus around which a major mobilization can be effected. We are definitely not in a position to accomplish this mission today. The inadequacy of our existing force—to fulfill its normal mission, to expand enough to train some millions of men in an emergency, and to carry out other expanding missions—is obvious.

As a sobering final thought, the strength of our military forces on active duty in the United States at the outbreak of World War II was more than twice as great as it will be on 1 July 1947. Furthermore, before Pearl Harbor, our Army consisted largely of combat units; today, it is almost entirely an administrative and logistical supporting force for occupation troops. Except for certain Army Air Forces units, we have almost completely demobilized our Army at home.

Unification of the Armed Forces

Top prioriy on the list of measures to strengthen national security, the War Department places unification of the armed forces under a single Secretary of National Defense. The decision on this widely discussed subject is the key to much of the legislative program proposed to the 80th Congress.

Current consideration of the subject dates back to 1944, when a special committee of the House requested the War and Navy Departments to present their views.

After considerable study, unification bills were introduced in both houses of Congress, but action was taken only in the Senate. In December 1945, the President sent a special message to the Congress endorsing a single department of defense, with three coordinate branches — Army, Navy and Air Force. A revised bill (S. 2044) was introduced in the Senate, but met with disagreement between the two Senate service committees. The President then called upon the Secretaries of War and Navy to adjust their differences; and agreement was reached on eight out of the twelve major points in the revised bill. The President accepted the eight points of agreement and resolved the four in disagreement by a compromise plan. Senate Bill 2044 was re-introduced incorporating these changes, but failed to pass before the 79th Congress adjourned.

Soon after the opening of the 80th Congress, on 16 January 1947, the Secretaries of War and Navy reported to President Truman that they had resolved the views of their departments, and were now prepared to support legislation which would provide for organization of the armed forces under a Secretary of National Defense, with three coordinate branches (Army, Navy and Air Force), the creation of a War Council, the establishment of the Joint Chiefs of Staff, a full-time representative joint staff, and the establishment of a Council of National Defense, a National Security Resourses Board and a Central Intelligence Agency.

The mission and responsibilities of these individuals and agencies are described in the joint letter of the Secretaries to the President, as follows:

Basic Agreement

a. There shall be a Council of National Defense, a National Security Resources Board and a Central Intelligence Agency (which already exists) as agreed by the Secretary of War and the Secretary of the Navy in their letter to the President of 31 May 1946. (See explanation on page 38.)

b. The armed forces shall be organized under a Secretary of National Defense so as to place the Army, the Navy (to include the Marine Corps and Naval Aviation), and the Air Force, each with a military chief, under the Departments of the Army, the Navy, and the Air Force respectively. Each shall be under a Secretary and, under the overall direction of the Secretary of National Defense, shall be administered as an individual unit. The Secretary of any of the three departments may, at any time, present to the President, after first informing the Secretary of National Defense, any report or recommendation relating to his Department which he may deem necessary or desirable.

c. A War Council shall be created consisting of the Secretary of National Defense as Chairman and with power of decision, the Secretary of the Army, the Secretary of the Navy and the Secretary of the Air Force, and the military heads of the three Services. The War Council will concern itself with matters of broad policy relating to the armed forces.

d. There shall be a Joint Chiefs of Staff consisting of the military heads of the three Services, and also the Chief of Staff to the President, if that office exists. Subject to the authority and direction of the Secretary of National Defense, the Joint Chiefs of Staff will provide for the strategic direction of the military forces of the United States, will formulate strategic plans, assign logistic responsibilities to the Services in support thereof, integrate the military requirements and, as directed, advise in the integration of the military budget.

e. There shall be a full-time joint staff to consist initially of not over 100 officers to be provided in approximately equal numbers by the three Services. The Joint

Staff, operating under a Director thereof, shall carry out policies and directives of the Joint Chiefs of Staff.

f. The Secretary of National Defense shall head the armed forces establishment, shall be vested with authority, under the President, to establish common policies and common programs for the integrated operation of the three departments and shall exercise control over and direct their common efforts to discharge their responsibility for national security.

Proposed Executive Order. The Secretaries attached to their letter a proposed draft of an executive order which they believe should be issued when legislation on the subject is enacted and approved. This proposed executive order sets forth the roles and missions of the armed forces as agreed upon by the two Secretaries. Under this order, the President would assign the following primary functions and responsibilities to the three armed services:

Section I—*Common Missions.* The common missions of the Armed Forces of the United States are:

1. To support and defend the Constitution of the United States against all enemies, foreign or domestic.

2. To maintain, by timely and effective military action, the security of the United States, its possessions and areas vital to its interest.

3. To uphold and advance the national policies and interests of the United States.

4. To safeguard the internal security of the United States as directed by higher authority.

5. To conduct integrated operations on the land, on the sea, and in the air, necessary for these purposes.

In order to facilitate the accomplishment of the foregoing missions, the armed forces shall formulate integrated plans and make coordinated preparations. Each service shall observe the general principles and fulfill the specific functions outlined below, and shall make use of the personnel, equipment and facilities of the other services in all cases where economy and effectiveness will thereby be increased.

Section II — *Functions of the United States Army. General.* The United States Army includes land combat and service forces and such aviation and water transport as may be organic therein. It is organized, trained and equipped primarily for prompt and sustained combat incident to operations on land. The Army is responsible for the preparation of land forces necessary for the effective prosecution of war, and, in accordance with integrated joint mobilization plans, for the expansion of peacetime components of the Army to meet the needs of war.

Specific. The specific functions of the United States Army are:

1. To organize, train and equip land forces for:

a. Operations on land, including joint operations.

b. The seizure or defense of land areas, including airborne and joint amphibious operations.

c. The occupation of land areas.

2. To develop weapons, tactics, techniques, organization and equipment of Army combat and service elements, coordinating with the Navy and Air Force in all aspects of joint concern, including those which pertain to amphibious and airborne operations.

3. To provide, as directed by proper authority, such missions and detachments for service in foreign countries as may be required to support the national policies and interests of the United States.

4. To assist the Navy and Air Force in the accomplishment of their missions, including the provision of common services and supplies, as determined by proper authority.

Section III—*Functions of the United States Navy. General.* The United States Navy includes naval combat and service

forces, naval aviation, and the United States Marine Corps. It is organized, trained and equipped primarily for prompt and sustained combat at sea. The Navy is responsible for the preparation of naval forces necessary for the effective presecution of war, and, in accordance with integrated joint mobilization plans, for the expansion of the peacetime components of th Navy to meet the needs of war.

Specific. The specific functions of the Navy are:

1. To organize, train and equip naval forces for:

a. Operations at sea, including joint operations.

b. The control of vital sea areas, the protection of vital sea lanes, and the suppression of enemy sea commerce.

c. The support of occupation forces as required.

d. The seizure of minor enemy shore positions capable of reduction by such landing forces as may be comprised within the fleet organization.

e. Naval reconnaissance, antisubmarine warfare, and protection of shipping. The air aspects of those functions shall be coordinated with the Air Force, including the development and procurement of aircraft, and air installations located on shore, and use shall be made of Air Force personnel, equipment and facilities in all cases where economy and effectiveness will thereby be increased. Subject to the above provision, the Navy will not be restricted as to types of aircraft maintained and operated for these purposes.

f. The Air transport necessary for essential internal administration and for air transport over routes of sole interest to naval forces where the requirements cannot be met by normal air transport facilities.

2. To develop weapons, tactics, technique, organization and equipment of naval combat and service elements, coordinating with the Army and the Air Force in all aspects of joint concern, including those which pertain to amphibious operations.

3. To provide, as directed by proper authority, such missions and detachments for service in foreign countries as may be required to support the national policies and interests of the United States.

4. To maintain the United States Marine Corps, the specific functions of which are:

a. To provide Marine forces, together with supporting air components, for service with the Fleet in the seizure or defense of advanced naval bases and for the conduct of limited land operations in connection therewith.

b. To develop, in coordination with the Army and the Air Force, those phases of amphibious operations which pertain to the tactics, technique and equipment by landing forces.

c. To provide detachments and organizations for service on armed vessels of the Navy.

d. To provide security detachments for protection of naval property at naval stations and bases.

e. To provide, as directed by proper authority, such missions and detachments for service in foreign countries as may be required to support the national policies and interests of the United States.

5. To assist the Army and the Air Force in the accomplishment of their missions, including the provision of common services and supplies as determined by proper authority.

Section IV—*Functions of the United States Air Forces. General.* The United States Air Force includes all military aviation forces, both combat and service, not otherwise specifically assigned. It is organized, trained, and equipped primarily for prompt and sustained air offensive and defensive operations. The Air Force is responsible for the preparation of the air forces necessary for the effective prosecu-

tion of war except as otherwise assigned and, in accordance with integrated joint mobilization plans, for the expansion of the peacetime components of the Air Force to meet the needs of war.

Specific. The specific functions of the United States Air Force are:

1. To organize, train and equip air forces for:

a. Air operations, including joint operations.

b. Gaining and maintaining general air supremacy.

c. Establishing local air superiority where and as required.

d. The strategic air force of the United States and strategic air reconnaissance.

e. Air lift and support for airborne operations.

f. Air support to land forces and naval forces, including support of occupation forces.

g. Air transport for the armed forces, except as provided by the Navy in accordance with paragraph 1 *f*, of Section III.

2. To develop weapons, tactics, technique, organization and equipment of Air Force combat and service elements, coordinating with the Army and Navy on all aspects of joint concern, including those which pertain to amphibious and airborne operations.

3. To provide, as directed by proper authority, such missions and detachments for service in foreign countries as may be required to support the national policies and interest of the United States.

4. To provide the means for coordination of air defense among all services.

5. To assist the Army and Navy in accomplishment of their missions, including the provisions of common services and supplies as determined by proper authority.

Agencies Agreed Upon

In the joint letter quoted above (16 January 1947), the two Secretaries stated their agreement on certain agencies described in their joint letter to the President dated 31 May 1946. In that letter, these agencies are described as follows:

Council of National Defense. To integrate our foreign and military policies and to enable the military services and other agencies of government to cooperate more effectively in matters involving our national security. The membership of this Council should consist of the Secretary of State, and civilian head of the military establishment, the civilian heads of the military services, and the Chairman of the National Security Resources Board, referred to below.

National Security Resources Board. To establish, and keep up to date, policies, and programs for the maximum use of the Nation's resources in support of our national security. It should operate under the Council and be composed of representatives of the military services and of other appropriate agencies.

Central Intelligence Agency. To compile, analyze, and evaluate information gathered by various government agencies, including the military, and to furnish such information to the National Security Council and to other government agencies entitled thereto. It should operate under the Council. An organization along these lines, established by executive order, already exists.

Universal Military Training

In his message to the 79th Congress on 23 October 1945, President Truman outlined a plan for Universal Military Training and asked the Congress to enact a law providing for such training. A bill (HR 515) was considered by the House Military Affairs Committee, but had not been reported out of committee when the 79th Congress adjourned last July. A new plan, which differs only slightly from the President's original recommendations, but which has been developed in more detail,

will be presented to the 80th Congress. There has been wide discussion of the War Department plan for UMT, but misunderstanding still persists in the public mind.

George Washington, in his presidential message to the First Congress, proposed a program for peacetime training of a citizen army. Today, with the tempo and concepts of war incredibly changed, the need for a constant reservoir of trained citizens is even more imperative. It would be impossible to mobilize our young men and to train them in the new type of warfare after war starts. There would be no margin of time for making additional soldiers out of the willing but untrained. The Nation would be forced to call again upon the veterans of the recent war to take the field a second time. But then, the weapons and tactics of modern warfare would be largely unfamiliar to them. The rifle training of an ex-infantryman would be of little use if he were handed, for the first time, a shoulder-fired 75-mm recoilless gun. The ex-pursuit pilot, expert with a 350-mile an hour plane would be helpless in a 700-mile an hour battle with jet-propelled craft.

A push-button, Army-less, robot war is a fantasy of the far future. Experience has proved that the more mechanized war becomes, the more urgently men are needed, and the more thorough and technical their training must be. Weapons change, but they still must be employed by men familiar with their use. With the certainty of a lightning-swift attack and follow-through in any future war, there is no alternative to the maintenance of a constant reservoir of trained soldiers. Since a standing Regular Army of several million men is completely out of the question, on a basis of cost, if nothing else, the only answer is a vast pool of trained civilians.

Not only is this the most economical answer, it is the logical answer in a democracy, where every able-bodied male citizen owes the obligation to his country of protecting it in an emergency. UMT would establish a national military policy which is entirely within the financial capabilities of our peacetime economy and which is entirely democratic in its nature. It would also place the world on notice that this trained manpower, linked to our tremendous resources, is immediately available. There would be, then, at least a hope that all nations would respect our strength. We must never again be led into the serious fallacy of trying to promote peace by setting an example of helplessness.

The estimated annual cost of UMT would be less than the cost of two days of any world war of the future. Respected authorities believe that, had UMT been in operation before World War II, the conflict might have been shortened by one year, saving about ninety billion dollars. Four days of World War II, in 1945, cost more than one billion dollars. The entire UMT program for the Army is expected to cost not more than one billion dollars a year. The total sustaining cost of a continuous UMT program would be less than the interest, at 2¼ per cent, on the cost of six months of World War II in 1945.

The UMT plan to be submitted to the 80th Congress provides:

That able-bodied male civilians between the ages of 18 and 20 will receive military training for not more than one year, with several options which make it possible for the trainee to terminate his Army camp training at the end of six months. Deferment up to the age of 20 may be allowed young men still in high school; and voluntary induction at the age of 17 will be permitted, with parental consent, for those who have completed or left high school. Except for the mentally and physically unfit, no exemptions are planned.

Young men will enter this program for training only. They will remain civilians and will not be members of the military

establishment; nor will they be available for combat or for other operational requirements during their training. They will not be subject to the Articles of War, but will be governed by a special Code of Conduct, based on the recommendations of a civilian advisory board. They will not be sent overseas and will not be liable for any future military service, except under a draft act passed by Congress in the event of another national emergency.

The War Department recognizes the necessity for establishing and fostering athletic, religious, educational and recreational programs which will improve the mental, physical, and moral fiber of the trainees. Correspondence courses and self-study courses which lead to academic credits will be provided, so as to permit continuance of formal education. These broader aspects of the training program, which supplement the military phase, have been referred by the President to a nine-man Universal Training Commission, which includes leaders of industry, labor, religion, education, and science.

Personnel for conducting UMT training will be drawn from all the armed services, including the National Guard and Organized Reserve Corps. Certain types of civilian specialists will be engaged; and UMT trainees, themselves, who show special aptitude and who desire to continue their training for the full year, will become trainers.

The training itself will contain as much practical military experience as can be packed into a limited course. The first six months will include intensive basic training combined with a beginning of branch and specialist training. A UMT experimental battalion has been organized at Fort Knox, Kentucky, under the supervision of Army Ground Forces. It will serve as a "pilot plant," testing the training plans, Code of Conduct, personnel needs, and other details of the UMT plan. Trainees are new Regular Army enlistees 18 to 20 years of age; and courses include training in the arms and services. The President's Advisory Commission on Universal Training, members of Congress, and national leaders in other fields will be invited to inspect the unit; and other interested citizens are welcome.

At the completion of his first six-months general training, the trainee may exercise any of the following options:

1. Remain in camp, under Army or Navy jurisdiction, for a further period of six months, in order to complete a full year of training.

2. Enlist in one of the armed services for a standard tour of enlistment.

3. Enlist in the National Guard at any location.

4. Enlist in the Organized Reserve Corps, with assignment to a fully organized (Class A) unit.

5. Enter one of the service academies, at West Point or Annapolis.

6. Enlist in the Organized Reserve Corps, enter a college and enroll in a course (including ROTC) approved by the War Department, *with Government aid.* Under this option, the trainee agrees to accept a Reserve commisson, if it is offered, at the completion of the course, and to perform active duty as a Reserve officer for a period of time as directed by the President.

7. Enlist in the Organized Reserve Corps, enter a college and enroll in a course (including ROTC), *without Government aid.* Under this option, the trainee agrees to accept a Reserve Commission, if offered, at the completion of the course.

8. Enlist in the Organized Reserve Corps and complete an advanced technical course, *without Government aid,* in a school approved by the War Department.

9. Enlist in the Reserve Corps and complete an advanced technical course approved by the War Department, *with Government aid,* under an agreement to per-

form such service thereafter as the President may direct.

10. Enlist in Enlisted Reserve Corps for six years. Subject to six months additional active duty training in this period at the rate of not more than thirty days a year.

Universal Military Training is urgently needed by the Nation, to build up and maintain the National Guard and Organized Reserve Corps, and to provide trained replacements for the veterans of World War II, in the general pool of trained manpower reserves.

A point to be emphasized is the impact of UMT on the Nation's educational system. In the first place, UMT supplies an incentive to graduate from high school. Secondly, it provides that many of the trainees with pronounced aptitudes will receive college or technical school scholarships in the form of Government aid. Finally, as indicated by current reports from colleges and schools, it will produce more mature, better disciplined college students, practiced in human relationships and with a better developed sense of values. These three by-products would be a distinct contribution to the normal educational processes of the country.

Twice the military staffs of our enemies have gambled on the relative slowness of our mobilization of men and materials. Each time they came dangerously close to being right. In World War I they were blocked by the thin red line of *poilus* at Verdun. In World War II, they were blocked by the immortal victory of the Royal Air Force and by the blood of millions of our allies, which bought us time. Time and space saved us—time to mobilize our industry, our agriculture, and our manpower; time to train the splendid military units which eventually brought us victory; and space over the vast oceans and the impenetrable Arctic wastes.

These historic advantages will not save us again. They were wiped out, almost overnight, by the late developments of World War II. The day of the musket is gone; but the day of the Minute Man has returned—with a vengeance. These modern Minute Men must be instantly ready for their complex tasks in the event of another threat to our Nation.

For the national security, UMT is the only sound alternative to a large standing Army, which nobody wants, and which would cost far more than the training plan proposed.

The statesman should study peace and the causes which tend to preserve or destroy it. History will teach him that peace ends in war and wars end in peace. If the causes which terminate peace and produce was cannot be removed, and if the legislator does not recognize and know how to create a powerful army, he ceases to be a statesman.

The Military Policy of the United States
Bvt. Maj. Gen. Emory Upton

Speed – Essence of Armor

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ALTHOUGH World War II furnished many examples of rapid advances in combat, in fact being characterized in its later phases, particularly in Europe, by a full fledged pursuit of a broken enemy, there were few examples of charges in the cavalry tradition, executed with a maximum of boldness and speed in order to attain surprise and minimize losses. This was not due to timidity or lack of skill on the part of commanders, but rather to the very nature of the campaigns themselves. The deadly weapons and the high degree of coordination and communication developed by all belligerents during the war precluded the use of such tactics in almost all cases. Yet a study of the few such actions which have been recorded underscores the fact that, although the optimum conditions required for their successful execution very seldom occur, the seizure of such an opportunity can spell the difference between success and failure of a mission. This is particularly true of armor, which, although capable of rapid and crushingly powerful movement, was so often characterized by slow, cautious attack, in which tank-infantry teams felt out, maneuvered against, and eventually took positions in sequence.

Such an action was the Allied attack against the Siegfried Line in October of 1944. Slow, costly, time consuming advance was the rule, forced upon the attacking units by the very nature of their objectives. The Siegfried Line was Germany's border defense, and the first defensive line that the German Army had been able to man since the breakthrough in Normandy. The "Holy Soil" of Germany itself was at stake, and the defense of the line was, therefore, stubborn and often fanatical. The attack procedure generally called for an infantry-tank team, with artillery and sometimes air support. One of several pillboxes, or a strongpoint, was selected for reduction. Smoke was laid on surrounding pillboxes and strongpoints to isolate the area under attack. A portion of the team laid down covering fire, to drive personnel in the open into the pillboxes, and blind the apertures. Then the remainder of the team moved in and reduced the area by direct assault and demolition. Once captured, the pillboxes were sealed to prevent the Germans from remanning the positions by means of small patrols which infiltrated during the night, a practice common during the early phases of the attack. After all of this was accomplished, the team reorganized to attack the next area. If such a method was impossible, direct frontal attack was the only alternative. Yet out of this creeping offensive came one of the best examples of a bold, swift tank charge, which gained the objective with negligible losses where slower, more powerful means had failed.

The incident occurred during the attack of the Second United States Armored Division, just north of Aachen. On the first day of the division's attack, 4 October 1944, the 3d Battalion of the 67th Armored Regiment entered the fray, spear-

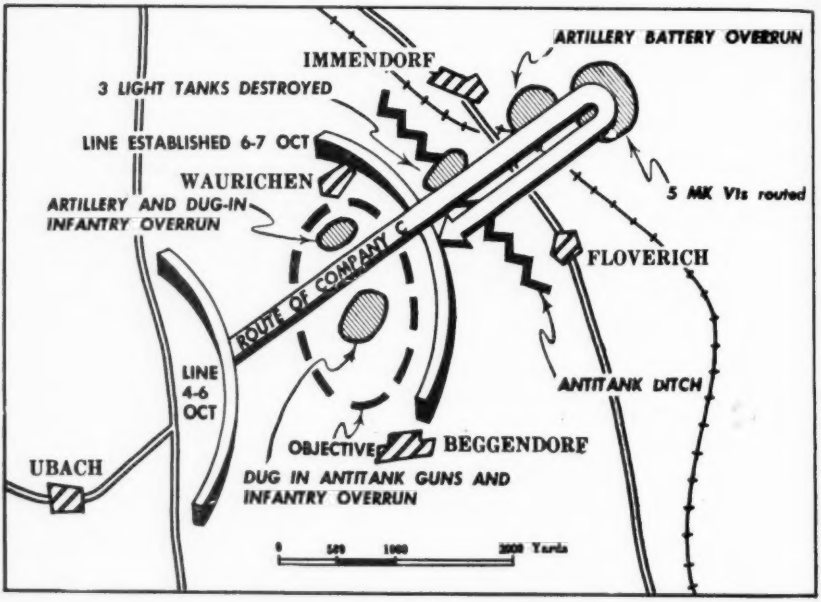
heading Combat Command "B." The battalion crossed the narrow Wurn River into the small bridgehead established by the infantry in Ubach, where it found itself under incessant artillery and direct heavy caliber fire. The infantry had not been able to push out to the outskirts of the town, and all exits were commanded by enemy tanks, 88-mm guns, and artillery fire. Under these conditions the force attacked, gradually pushed out and finally cut the north-south highway approximately one thousand yards east of Ubach. This was accomplished in the face of direct tank, antitank, small-arms, and artillery fire. The attack was pushed despite mounting losses until a line was established late on the 4th about three hundred yards east of the highway. (See sketch.)

The next morning the battalion again jumped off to press the attack, with the medium tanks leading. As the first wave reached high ground a thousand yards east of the main road, they were caught in a withering cross-fire of dug-in tank, antitank, assault guns, and artillery, as well as fire from the pillboxes to the east, north and south. The tankers hung on stubbornly, attempting to advance against this hail of fire, but were finally forced to withdraw into defilade after suffering heavy losses. From this position they continued to return the fire of the enemy guns until their ammunition supply was exhausted, and they were forced again to withdraw, this time to the jump-off line. Again, at 1300, another attack was launched. In spite of friendly artillery fire, supporting fire from flank units, and covering smoke, the attack again failed, so completely were the German guns "zeroed-in" on the open ground which had to be crossed. Air support was impossible, due to the low clouds and drizzling rain which prevailed throughout the fight, and a flanking movement was precluded by the uniform continuity of the German line. The only approach possible was a direct frontal attack.

The morning of 6 October dawned gray and wet, and under the lowering clouds the 3d Battalion launched yet a third attack. At 0800 an artillery serenade was placed on every known enemy strongpoint, and simultaneously the tanks rumbled forward. Again they were met by withering fire. The enemy had brought up strong reinforcements of armor and artillery, determined to check the tenacious attack. Direct fire from Mark V and Mark VI tanks was added to the increased weight of artillery, antitank, mortar, and small-arms fire. Movement outside of the protection of the tanks' armor was suicidal, so concentrated and sustained was the weight of the enemy fire. The 3d Battalion's losses continued to mount as the M-4s slugged it out with the more heavily armed and armored Mark Vs and VIs. They gradually withdrew to the jump-off line, leaving a trail of blazing and knocked-out hulls behind them. At this point the losses suffered by the battalion left only a fraction of the original attacking force. In the two days of futile attack the battalion had suffered sixty-three per cent casualties in medium tanks.

Another attack with the mediums was obviously impossible. The enemy fire had not been diminished. On the contrary, it was steadily increasing as the Germans brought up new reinforcements. Units on the right and left were in as bad a situation as the 3d battalion. Fighting against the same type of opposition, their losses were correspondingly as great. An infantry attack would be suicidal. And the medium task force was so depleted that they could muster less than half of the strength with which they had made the first attack three days previously. But perhaps speed would succeed where power had failed. "C" Company, the light tank company, was holding the left flank and had suffered relatively light casualties. The minds of

the commanders turned to this, their last hope. "C" Company was composed of seventeen M-5 light tanks, armed with 37-mm guns—weapons which would worry the heavily armored German tanks no more than a mosquito sting. The M-5's armor was light, so light that a hit by any of the German guns, except their small arms, meant certain destruction. But the M-5s had one thing the Germans did not have mine fields could be avoided, and if it were necessary to go beyond the objective, the light tanks might be able to negotiate the obstacles that lay beyond. They would be followed by the slower mediums in the second wave, with infantry following close behind to hold ground taken. Their mission was to overrun the enemy defenses with as much speed as possible, cause what destruction and disorganization they could,



—speed. And in this one advantage their commander placed his hope.

"C" Company was withdrawn and a thin covering force placed in the line where it had been. As the light tanks formed behind the line of battered mediums, their commander outlined the plan. According to all available information and observation, no tank barriers and a few mine fields existed on their route, at least as far as the objective, which lay on the high ground just south of Waurichen. The and allow the heavier elements and the infantry to come up and occupy the objective. The attack hinged on their success in overrunning the defensive positions before those defenses could knock them out. Speed and daring were the keynotes.

Gathering themselves, the light tanks burst through the lines of mediums at 1100 on the morning of the 6th, throttles wide open and the prayer of every man in the line riding with them. At thirty-

five miles per hour the M-5s screamed toward the enemy in a single weaving line. The German gunners must have thought them mad. Then, as the realization dawned that they could not track these fleeting targets in their sights, the seeds of panic were sowed. The tankers and infantry who were to follow watched in wonder. One thousand yards, and not a tank hit. The mud and soft ground which had made the mediums sitting ducks for the German guns were no great hindrance to the lighter M-5s. Two thousand yards, and still not a gap appeared in the charging line. The Germans were firing every weapon they had, and the line was alive with stabbing flashes, but the light tanks seemed to bear charmed lives. Individual Germans began to run to the rear. But every gun in the swiftly advancing line was firing, and they were cut down before they fairly started. Then the company disappeared in the low ground before Waurichen, and mediums and infantry moved forward behind them.

On the objective, the left of "C" Company overran a strongpoint of artillery and dug-in infantry. The right of the company overran a strongpoint of dug-in antitank guns and infantry at the same time. So rapid had the advance been that the positions were still manned. Without pause, individual tanks altered course, overran the guns, cut down the crews that tried to run, and left the remainder cowering in their holes. Light fire was being received from Waurichen and Beggendorf, but it was ignored, for now heavy caliber fire was being received from a point between Immendorf and Floverich. With undiminished speed, the company continued its headlong charge in that direction. Just east of Waurichen, the company ran into an antitank ditch. All but three of the tanks successfully crossed it. Those three, bogged down in the ditch, were immediately knocked out. But their battle-wise crews, well knowing the fate of a stationary M-5 under that murderous fire, had already abandoned their tanks and later made their way to safety. These were to be the only light tanks knocked out in the engagement.

Once across the ditch, the company continued with unabated speed. The north-south highway and railroad between Immendorf and Floverich were cut. Here the artillery battery which was delivering the fire received just south of Waurichen was encountered. The guns were destroyed and the crews either killed or wounded, or left for the following force to take prisoners. Then five Mark VI tanks appeared. Knowing their own weaknesses and strength, the lights, rather than seek cover, continued their charge. The German crews vainly tried to track with their manually operated turrets, while the M-5s literally ran circles around them. Round after round of 37-mm ammunition bounced off the sides of the heavily armored German tanks, causing little damage other than the discomfort of the crews inside. Outflanked, and in danger of being completely cut off, the Mark VIs retired in confusion. "C" Company, triumphant, awaited further orders. They had succeeded, brilliantly, where the slower, more powerful attacks had failed. By their skill and courage they had finally broken Hitler's "Westwall," for now they rested in the eastern fringe of the Siegfried Line. The pillboxes they had bypassed and the guns and infantry they had overrun lay behind them, at the mercy of the remainder of the battalion.

The mediums and the infantry, in the meantime, had come up behind "C" Company, and now occupied the objective. Mopping up was in progress, and units on the right and left were coming up on line, pressing the bewildered Germans hard. But "C" Company was fifteen hundred yards ahead of this line, surrounded except for a narrow corridor to their rear

—their path of advance. The German reaction, once the company had stopped, would not be long in coming. Further advance of the main force was precluded by the immediate necessity of stabilizing the entire line, orders for which had already been issued. Maintenance of its extended position was, therefore, unsound, and "C" Company was withdrawn to the main line.

Originally, Waurichen was not taken, and fire from that town increased steadily during the night, so that at dawn on the morning of the 7th, a force was sent in which took the town, straightening out the line.

In its attack "C" Company had destroyed two batteries of artillery, several antitank guns, and numerous smaller arms. It had made possible the capture of several pillboxes, much matériel, and over two hundred prisoners. It had routed a full platoon of vaunted German Mark VI tanks, and had advanced the American line almost twenty-five hundred yards. This it had done with weapons and armor vastly inferior to that of its opponent. The disparity was made up in gallantry, skill, and raw courage. The battalion was later given the Presidential Unit Citation for its part in the Siegfried Line offensive, and no unit more richly deserved it than this company of light tanks, which had proved that a full-dress charge, skilfully executed under the proper conditions, still had its place in the tactics of the United States Army.

An M-5 light tank in Germany. (Signal Corps photo.)

Communications in Army Ordnance Service

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SELDOM is it necessary to convince any military man of the indispensability of uninterrupted communications within the tactical setup of an operation. However, when we consider communications within the services which support the tactical units engaged in the operation and between the supporting sources and the supported tactical units, an attempt to get authorization for personnel and equipment to establish an adequate communications system within, and between, the various echelons of the services often meets with a lack of interest or outright opposition on the part of those individuals to whom the recommendations or requests are submitted.

The purpose of this article is to show how an adequate communications system can increase the efficiency of a service in accomplishing its mission of supporting the combat troops. Ordnance service in the First U.S. Army is used as an example with specific situations which arose in one of the ordnance groups assigned to First Army.

The history of communications in First Army Ordnance during operations goes back to England in the days of preparation for the landing on the coast of France. The ordnance officer of the First U.S. Army realized the importance of an adequate communications system in his organization of ordnance service for the troops. He had learned the hard way. His knowledge was based upon his experience as an ordnance officer in North Africa and Sicily; first, as commander of an ordnance battalion, second, as ordnance officer of an independent Corps, and finally, as ordnance officer of a Corps which was part of an Army. From his experience in the above mentioned positions he had become firmly convinced that priority in the replacement of combat matériel, and continuity of Class V supply can only be maintained if continuous control can be exercised; and further, that continuous control can be exercised only to the extent that communications are effective.

An examination of Tables of Organization and Equipment for Ordnance units and detachments will show that few include any appreciable amount of communication equipment or personnel. Inconsistencies will be found such as switchboards, telephones, and wire without linemen, linemen's tools, or switchboard and telephone operators.

With the firm conviction that First Army Ordnance should have an adequate communications system, the Army Ordnance Officer embarked upon a strenuous campaign of selling his conviction to the "powers that be." Blessed with a forceful and convincing argument, coupled with facts in proof thereof, he was successful

in convincing his Commanding General and in obtaining authorization for the necessary equipment.

Having obtained authority for equipment needed, the next step was to obtain it physically and to get the necessary trained personnel for operations. The equipment was procured through signal channels. However, the procurement of trained personnel to operate the equipment, especially radios, was a more difficult problem. Having learned in Africa and Sicily that "battlefield recovery" of repairable ordnance matériel was of prime importance, and there being no suitable ordnance unit organized or equipped to accomplish this important mission, the Army Ordnance Officer obtained authority to reorganize and alter the equipment tables of four ordnance evacuation companies into ordnance collecting companies. The ordnance evacuation company is authorized six officers and 179 enlisted men. To operate efficiently the equipment authorized for the provisional collecting companies, only four officers and 122 enlisted men were required. Thus, it was possible to make available approximately 200 enlisted men and eight officers for other purposes. Here were the required communications personnel. However, there was one small stumbling block; this available personnel could not operate switchboards or radios.

Again, the Signal Corps of First Army came to the assistance of Ordnance. Selected individuals from various ordnance units were given an intensive training course in radio transmission and reception, switchboard operation and other specialist training in signal communication. Using this personnel as instructors, and under the guidance of a qualified officer, the Army Ordnance Section conducted its own course of training for communications personnel. D-day found First Army Ordnance equipped with sufficient personnel and equipment to operate its own communications system in the combat zone.

When all ordnance units assigned to First Army had landed on the Continent, each group and battalion headquarters was equipped with radios, larger capacity switchboards, and from ten to fifteen miles of wire. Radios were distributed as follows:

Army Ordnance Officer,	1	SCR-193
Four Ordnance Groups,	12	SCR-193
Eleven support, intermediate, and main Army Ordnance Battalions,	11	SCR-193
Three forward Ordnance Battalions,	15	SCR-193
Four Ammunition supply points,	4	SCR-193
Three Corps Ordnance Officers,	3	SCR-193
Ordnance Officer ADSEC	1	SCR-193
Four Ordnance Collecting companies,	9	SCR-284
Mobile sets and reserves,	13	SCR-193

During the beach phase of the operations and prior to the St. Lo breakthrough, conditions were such that all normal communications could be accomplished by wire or motor messenger. Distances between units were small, and companies and battalions were situated so that they could usually hook into the switchboards of larger units, such as corps and divisions. However, for purposes of training, maximum use was made of radio communication between the various headquarters within the several nets. Many messages were transmitted by radio and confirmed in writing, primarily for the purpose of increasing the efficiency of our radio communications. This additional training during the beach phase of operations, paid for itself many times over after the breakthrough at St. Lô and during the subsequent race across France and Belgium.

From 27 July 1944, when the St. Lô breakthrough occurred, until early in September 1944, when the First and Third

U.S. Armies halted at the Siegfried Line, units of First Army Ordnance were strung out in depth to such an extent that at times the forward battalions were as much as two hundred miles in advance of the rearmost Army Ordnance installations. During this time, wire communication between units was impossible. Distances were so great and the roads were so congested that communications by motor messenger were, at best, extremely difficult. Keeping in mind that the replacement of combat matériel can be maintained only if continuous control can be exercised, and this only to the extent that communications are effective, First Army Ordnance was forced to rely upon radio as its principal means of communication in order to exercise the necessary control over its units.

In combat, there are always certain items of matériel, the need of which exceeds availability. In order to assure that the limited number available of these critical items would be given to those units in whose hands they would assist most in the accomplishment of the mission of the Army as a whole, First Army Ordnance had, from the time it was established on the beach, retained control of the allocation and issue of such critical items. Throughout the European Campaign the 52d Ordnance Group had the mission of furnishing ordnance maintenance support to the units of the three corps of First Army. This support included the supply of ordnance Class II and IV supplies. During the rapid advance across France and Belgium, the authority for allocation and issue of critical items to supported units was delegated to the 52d Ordnance Group.

Requests by division or separate units for critical items were received by the group, either directly from the unit or through the supporting ordnance unit. Many of these requests were transmitted by radio through the supporting ordnance battalion. Allocations were made by radio and orders to deliver the supplies to the using units were transmitted by radio. In many instances, hours, and sometimes days, were saved in the delivery time of critical items of material or critical supplies to combat units that were engaged in the pursuit of the enemy. At the same time Army Ordnance, through the Ordnance Group, was able to maintain control of its critical items and to know, at all times, the status of such items on hand. In so far as possible, reserve items in critical supply had been dispersed among the forward ordnance battalions in order to have them as near as possible to the units to which they would be issued. Even though these forward ordnance battalions were almost constantly on the move, it was possible to transmit delivery orders by radio to the moving battalion and have delivery of supplies started immediately. Much more time would have been consumed in placing the needed material or supplies in the hands of combat units had it been necessary to have dispatched delivery orders by a motor messenger who would have had the very difficult task of overtaking and locating a rapidly advancing ordnance battalion or company.

Battalion commanders were given the authority to move individual companies of their battalions without prior approval of group headquarters and to report the move immediately to group headquarters. Forward battalions in direct support of corps were likewise given this authority to move their own headquarters when necessary in the accomplishment of their missions. However, with prompt reporting by battalions, of such moves, the group was able to maintain constant control over its units.

Figure 1 shows locations of First Army Ordnance, 52d Ordnance Group Headquarters, and the battalions of the 52d Ordnance Group as they were on the af-

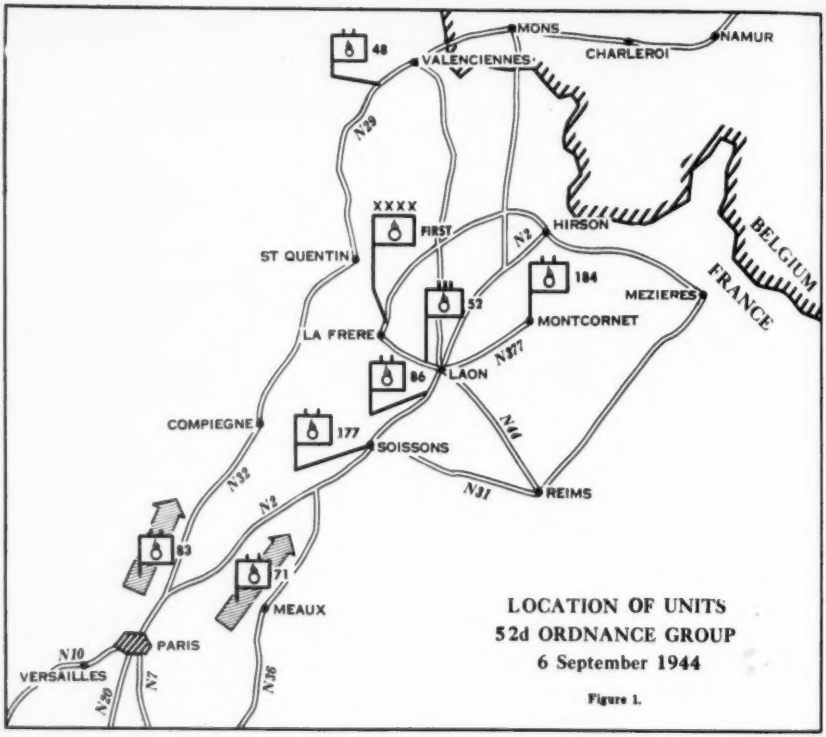


Figure 1.

ternoon of 6 September 1944. The dispersion of units as shown is typical of the many situations which existed between 15 August 1944 and 20 September 1944, and later during the advance from the Rhine River into Central Germany. The 184th and 83d Ordnance Battalions were in support of XIX Corps. The 48th and the 71st Ordnance Battalions were supporting the VII Corps, and the 177th and 86th Ordnance Battalions were in support of the V Corps. A schedule of one messenger run per day was maintained between the 52d Ordnance Group and the First Army Ordnance Officer, and between the Group and each of its six battalions. With the transportation available, maintaining this schedule was extremely difficult and anything in excess of that would have been impossible. Messenger service was adequate for routine reports, messages, etc., but was quite inadequate to meet other communications requirements in the ever changing situation.

The use of relays and intermediate stations set up from reserve sets was resorted to extensively. If distances involved were greater than the range of the radio sets, additional sets were sent to intermediate points; thus group headquarters was enabled to maintain continuous radio communication with its subordinate units.

As the advance of the First Army slowed and finally stopped early in September, generally along the German border, ordnance units were able to settle into semi-permanent locations and attack their tremendous job of maintaining ordnance equipment which had taken a severe beating during the rapid movement from the beach area in Normandy. Furthermore, much equipment was, by now, beginning to wear out and needed replacement, which situation further complicated the ordnance and supply problem.

Figure 2 shows the locations of units of the 52d Ordnance Group as they were from about the middle of October until 16 December 1944, when the "Battle of the Ardennes" commenced. The one run per day messenger schedule was in effect during this period. And, although the need was not so great as during August and September, considerable use was made of radio communications during this period. First Army Ordnance again opened its radio operators' school, located in one of the rear battalions of the 72d Ordnance Group which operated the main army shops and depots. This training program was amply justified during the critical days of the "Bulge" when radio was again the principal means of communication within First Army Ordnance.

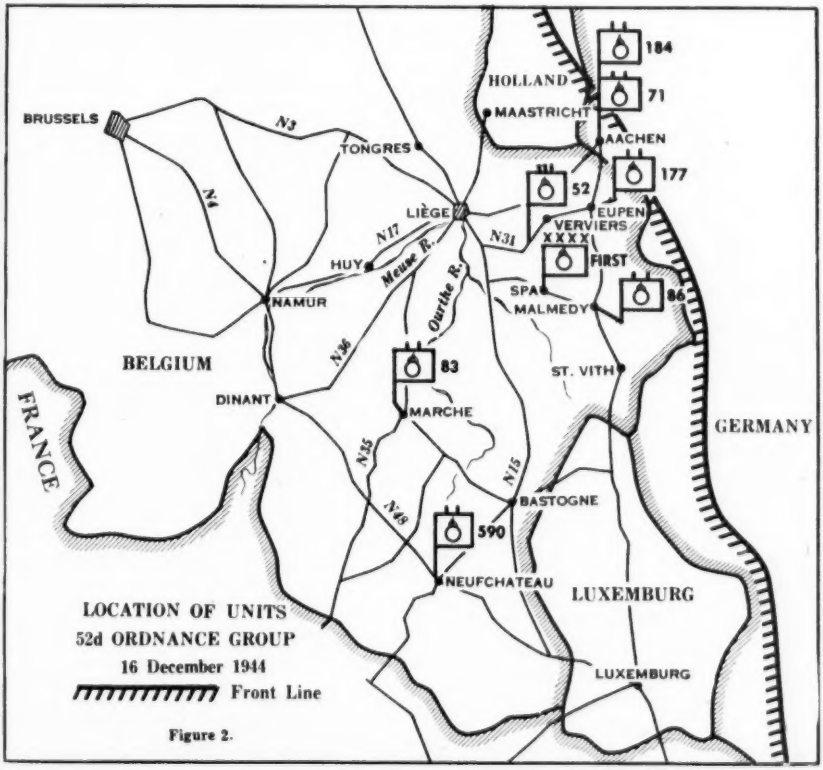


Figure 2.

During the period of 1 October to 16 December inclusive, wire communications were, in general, good. Here, for the first time, teletype came into use between Army Ordnance, the ordnance groups, and ordnance depots and ASP's (army supply points). Allocations and supply status reports were habitually transmitted by means of teletype. The length of such allocations and reports made their transmission by radio prohibitive. Had teletype not been available, such lengthy messages would, of necessity, have been transmitted by messenger. With this rapid means by transmission, ordnance was enabled to deliver vital equipment into the hands of combat troops many hours sooner than would have been possible otherwise. Time saved in delivery of weapons, vehicles, ammunition and critical supplies meant the saving of lives of combat soldiers.

During the critical days of the "Battle of the Bulge," radio played what was probably its most important role in First Army Ordnance Service. Figure 2 shows locations of ordnance battalions of the 52d Ordnance Group as they were on 16 December 1944, when the Germans opened their offensive in the Ardennes. Two bat-

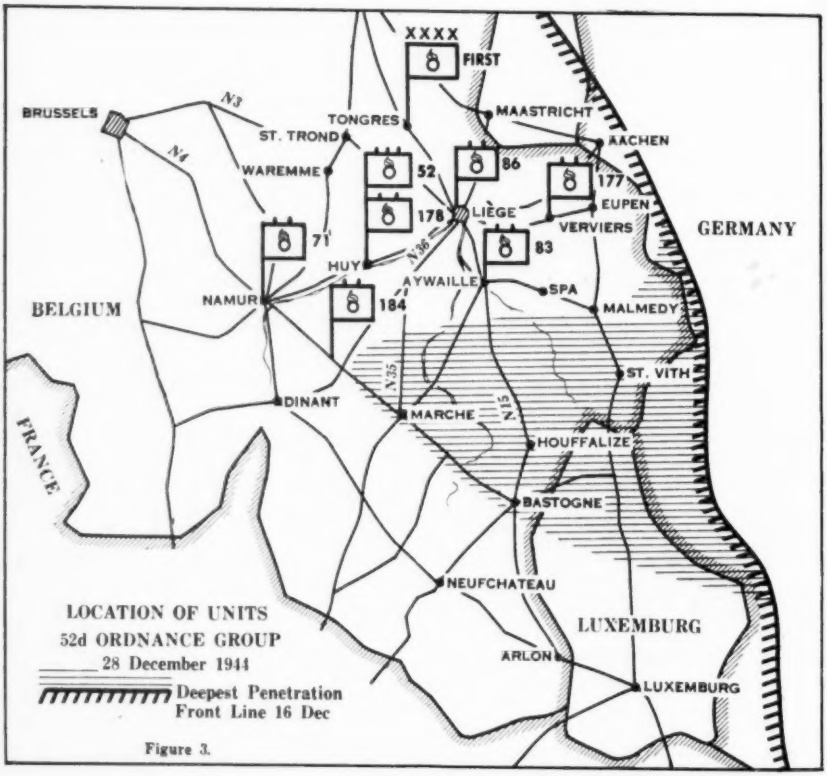


Figure 3.

talion headquarters and approximately twelve ordnance companies were located in the path of the advancing German forces. All these units, with the exception of one ordnance medium maintenance company were withdrawn without loss of personnel or matériel. One battalion headquarters, the 86th, and several of its companies, located in Malmedy, were ordered by telephone to withdraw on the afternoon of 17 December. This was the last wire communication that the 52d Ordnance Group had with any of its units located in the sector of the German attack. All other units of the 86th Ordnance Battalion and the entire 83d Ordnance Battalion were alerted by radio and, as the necessity arose, were ordered to withdraw along specified routes.

During the next two or three days, Army Headquarters moved twice and 52d Ordnance Group Headquarters moved twice. During this time Group Headquarters was in continuous radio communication with Army Ordnance and with all its battalions. The 86th Ordnance Battalion was ordered to concentrate its units north of the Meuse River in the vicinity of Liege. The 83d Ordnance Battalion was ordered to concentrate its units west of the Meuse River in the vicinity of Dinant. The orders for all these movements were transmitted by radio and were successfully executed. Group kept Army Ordnance and its own battalions informed of its location at all times and the battalions kept group informed of their locations at all times. Due to constant movement of units, uncertainty of the tactical situation, traffic congestion, and rough and icy roads, it would have been impossible for the Group to maintain control over its units or even have reliable information as to their locations had it been necessary to rely on messenger service alone.

The withdrawal of 52d Ordnance Group units included the evacuation of two ordnance depots from the area later overrun by the Germans. These depots contained approximately 1,000 tons of ordnance Class II and IV supplies, not one ton of which was captured by the enemy. During the next few days, these supplies met critical shortages occassioned by losses suffered by combat units at the hands of the advancing Germans.

At the time of the deepest penetration by the Germans, the units of the 52d Ordnance Group were located as shown in Figure 3. From this point they supported the reduction of the "Bulge" and then moved into new positions from which the spring offensive by First Army was supported.

Many other specific instances could be cited in which communications played a prominent part in the saving of much needed material and in the rendering of efficient service to combat units. From the end of the "Bulge" until VE-day communications continued to play a vital role in ordnance service within the First U.S. Army.

The attention of the reader is invited to the fact that with the exception of a few telephones, a small amount of wire, and a few switchboard operators, all the personnel and equipment of the First Army Ordnance Communications System was in excess of appropriate T/O&E, and was obtained by special authorization. It is earnestly hoped that, in the adoption of future tables of organization and equipment for ordnance units, serious consideration will be given to this vital accessory to ordnance service—communications—and that adequate personnel and equipment be provided therefor.

Radar and the Future

Lieutenant Colonel L. M. Orman, *Signal Corps*

THE marvel of World War II is of course the atomic bomb. Second only to the bomb is the marvel of radar. Originally designed and invented to provide a means of detecting the approach of planes, it came to serve many purposes and many masters during the course of the war. Let us briefly review some of the more important uses of this new weapon.

The Past

From detecting planes, radar was soon expanded to detect surface craft. Searchlight control followed. Better radar sets subsequently made the use of searchlight illumination of targets a questionable procedure, since radar could now be used directly for fire control. Surface fire control sets were developed simultaneously with antiaircraft sets, while the Air Forces concurrently found new uses for radar. GCI (Ground Controlled Interception) and AI (Aircraft Interception) were among the earliest of these.

The first offensive use of radar was BTO (bombing thru overcast). Navigation by radar, radar heightfinding of planes both from the ground and from the air followed in short order. GCA (Ground Controlled Approach) was one of the latest developed uses, and racon, a beacon which would broadcast signals only when interrogated by a special set carried in our own planes was another navigational aid developed. While not a true radar in that it does not use the echo principle, loran and the other "avigation" systems should be mentioned. Paratroopers used Rebecca-Eureka, a device on the radar principle, as an electronic signpost. Radar was used for mapping and for weather observations, and in the closing stages of the war it was also being used extensively for counter-mortar work.

Radar's Weaknesses

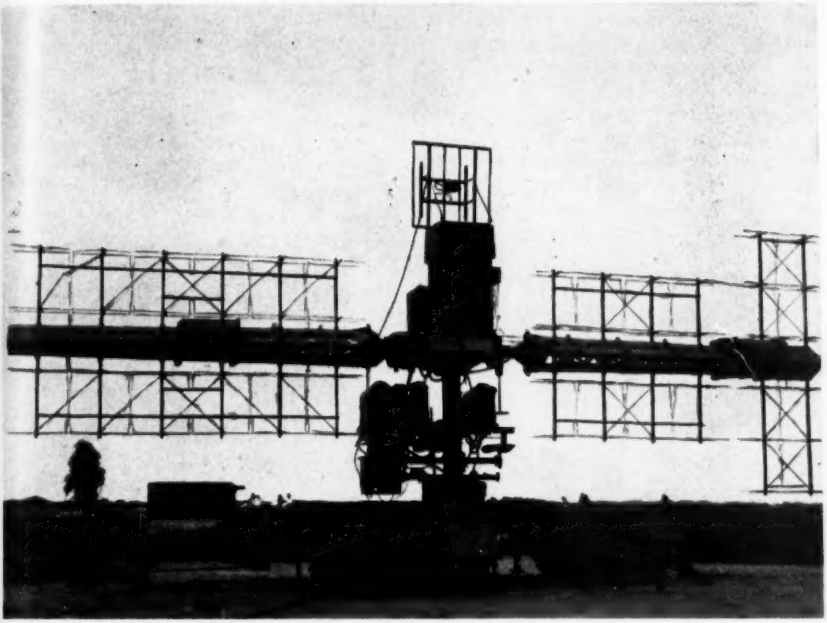
Certainly the uses of radar are many and at first appear almost limitless. However, it has its limitations and weaknesses. Before we attempt to speculate on the future of radar let us examine some of them.

1. Radar can be jammed, as our enemies discovered early in the war, and they expended a great deal of effort in trying to render our sets ineffective. Although we were usually able to keep a half a jump ahead of them on this score this specter always must haunt the designer and the user of the radar set.

2. The use of radar sets betrays our own presence. A radar set is about as quiet electrically as an artillery barrage is acoustically. Sets may be detected many miles beyond their maximum range by the use of special receivers.

3. Radar search patterns have nulls and dead areas in them hence, coverage is not as complete as desired. This is especially true in the vertical coverage pattern.

4. Radar picks up unwanted targets, which clutter up the scope. Many instances are recorded during the war of planes



Radio set (Radar) SCR-268 earliest of U.S. radars, three trucks to pull it and components. (Signal Corps photo.)

sneaking in hidden in the cluster caused by ground reflections.

5. Radar is affected by weather, but while all of the effects of weather are not adverse (the range is greatly extended under certain conditions) the difficulty experienced with some of the shorter wavelength sets in rainy weather renders them almost useless.

6. There are limitations on minimum and maximum range, and on both range and azimuth accuracy that vary a great deal with the frequency used in the individual set.

7. Radar sets by themselves are unable to identify the nationality of the detected plane or ship. The auxiliary means used during the war, IFF (Identification of Friend or Foe), was on the whole unsuccessful.

The Future

Obviously the first goals in the future will be radar sets which can overcome some of the limitations of present sets.

Although much of the effect of countermeasures may be nullified by proper training and indoctrination of radar operators, it is essential that future radar sets incorporate the best known safeguards against radar jamming. Large strides have been made in this direction, and it is reasonable to expect more in the future.

It does not appear reasonable to expect to hide radar sets in the future.

However, the betraying of our own positions by radar operations is not a serious limitation. When tactical surprise is desired sets may easily be turned off.

A great deal of progress has already been made since the first radars appeared in the elimination of nulls and dead areas. We may expect more success in this direction.

Several different devices are in various stages of perfection for the elimination of ground clutter and other fixed targets. Of course while such devices will not allow a radar set to see through a nearby mountain they will greatly assist in preventing a plane from hiding in the clutter on the scope until it has accomplished its mission.

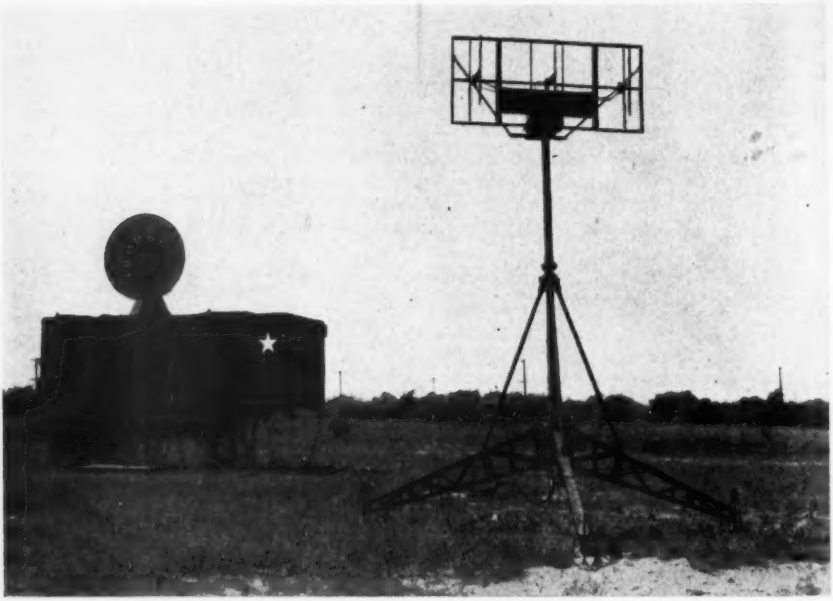
As far as weather is concerned, it is predicted that the biggest steps in overcoming any adverse effects of weather will be made by the users as experience is obtained in the field.

Designers, by the proper selection of frequency and other operational characteristics, will be able to overcome most of the range and azimuth limitations built in a particular set for a particular purpose.

A great deal of effort and money was spent during the war on IFF without producing an entirely satisfactory identification device. Let us hope that the future brings forth an answer to this perplexing problem. It is felt among many electronics men that a radical departure from the presently known IFF will be the answer.

Civilian Use

There has already been a great deal of



SCR-584 (including IFF antenna). (Signal Corps photo.)

SCR-784 on trailer K-84. (Signal Corps photo.)

rather uninformed speculation about the peacetime uses of radar. It will be clear from what has gone before that the direct and immediate use of radar in civilian life will be to make air and sea navigation entirely continuous and foolproof, regardless of night or weather. It seems that radar will be installed on every ship at sea, and probably on every tug and ferryboat in harbors. It should prevent collisions in fog and accidents with icebergs, and permit a ship to sail safely into any harbor in the world irrespective of the weather. Similarly, airplanes should be able to fly over mountain ranges and New York's skyline in storms without mishap, for their position above the mountains and buildings will be known at all times with a radar set. GCA will permit airplanes to effect blind landings at any airport in bad weather, day or night, and should be able to avoid collisions with other aircraft. Teleran (television-radar-air navigation) will permit the transmission of ground radar information to the aircraft, as well as weather maps, ceiling and visibility information, and traffic instructions.

On the other hand, the application of radar to land transport, trains and automobiles, seems to have little immediate application. One of the characteristics of radar is that the ultra-high frequency radio waves used, travel in comparatively straight lines and cannot see around corners or over hills, and hence could contribute little to the safety of land transport.

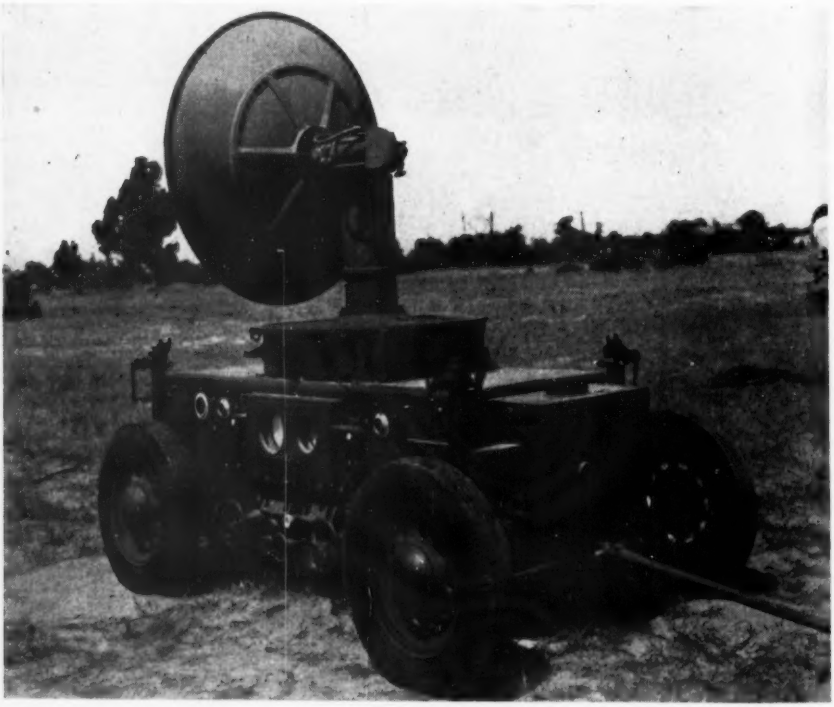
Military Use

In the field of Military Science, however, radar appears to be destined for an even greater number of uses. Obviously, all of the above safety measures suggested for civilian use will be applied directly to military fields.

Perhaps the most logical development

of radar equipment that can be anticipated is lighter, more mobile equipment. Great strides have already been made in this direction. A comparison of the Army's first searchlight radar set and the present one will clearly demonstrate this. Greater accuracy, ruggedness, dependability, and simplicity of operation are all goals that may well be achieved. It is to be anticipated that radar sets used for target detection and fire control will be integrated more closely into the computor-data transmission-gun team of artillery units. Such an integration may well include the communication system of the firing unit and even a radar chronograph operating on the Doppler principle. Each battery will probably obtain its own weather information and make its own artillery surveys with electronic devices. Armored vehicles will probably use radar for fire control and in navigation.

But the field of guided missiles offers the broadest and most important one for radar and/or other electronic devices. Radar devices seem to be the main hope for defense against this type of weapon and undoubtedly radar or some other electronic device will be used in the offensive control of them. It is a well known fact that our Navy achieved some success in this field during the war.



Radar set AN/TPL-1, mounted on transport. (Signal Corps photo.)

When infantry units started to use radar for counter-mortar work it was noticed that vehicles and even individual men could be detected on occasion. This, too, has possible tactical applications.

The contact of the moon by radar has practical values. To science it means that the moon may eventually be mapped. Refined measurements can be made of the speed of light, the speed of the moon, and the distance to the moon. But the most important scientific fact thus established is that the various layers of the atmosphere—some of them bearing electrical charges—can be penetrated by a radio wave. Since rocket missiles travel outside the earth's atmosphere it was not certain that radar could track them. That doubt has been removed. Similarly, long range jet or rocket missiles might be radio controlled from the earth.

Conclusion

The biggest influence on civilian life that radar will have is indirect. The thousands of man-years which have gone into the improvements of the detailed components which make up a radar set—many of these components being identical with those of a radio or television set or hearing aid, or other electronic device—have made obsolete many of our pre-war ideas about what could and could not be done in electronics.

Altogether it is fair to say that radar, as radar, will have a mild beneficial effect on all our lives as civilians, by making it safer to travel by sea or air. But the impact generally of electronics techniques developed during the war because of radar, will have profound and far-reaching effects on the shape of our daily life.

As regards the military man, he may reasonably expect radar to enter into almost all phases of combat both offensively and defensively in many different forms, doing a multitude of diverse tasks. No matter what branch of the service he is in, he may expect to come in direct contact with radar in some of its many forms. And certainly the staff officer will meet radar again and again, doing a myriad of jobs throughout all the armies of the world.

It is my personal opinion, that the greatest single motivating force for world peace today is the organized military potential of the United States —its resources, its technological advancement and its superbly trained manpower.

General of the Army Dwight D. Eisenhower

Special Disease Hazards
In Basic Training Centers

Colonel Karl R. Lundeberg, *Medical Corps*
and
Philip E. Sartwell, MD
Preventive Medicine Division, Office of The
Surgeon General

THE incidence of a number of the acute infectious diseases transmitted by respiratory tract discharges is much higher in basic training centers than at other installations. Since these diseases comprise better than thirty per cent of total disease admissions to hospital and quarters, their importance to the training program is obvious. While the Medical Department is charged with the responsibility of "investigating and determining the factors which affect the health of the Army and with recommending and supervising measures for the control and prevention of disease in military personnel" (par. 1, AR 40-210), commanders of all grades are charged with "putting into effect and enforcing the provisions of these regulations . . ." (same reference). Practically all control measures which the surgeon may feel are indicated require the help of the line or staff for their execution. Some of them may be impractical and others temporarily impossible of accomplishment for military reasons. Serious considerations should, however, be given to all such recommendations, even though they may appear to interfere with the conduct of training, since their objective is to reduce loss of training time through illness.

It is well known that recruits are more susceptible than seasoned troops to many of the diseases transmitted by respiratory tract discharges. This fact has had a marked effect on the prevalence of communicable diseases in training camps during past wars. The American tradition of maintaining a small standing Army, augmented by a large and rapid mobilization of recruits and inductees at the start of hostilities, has made the health problems of recruits of special importance.

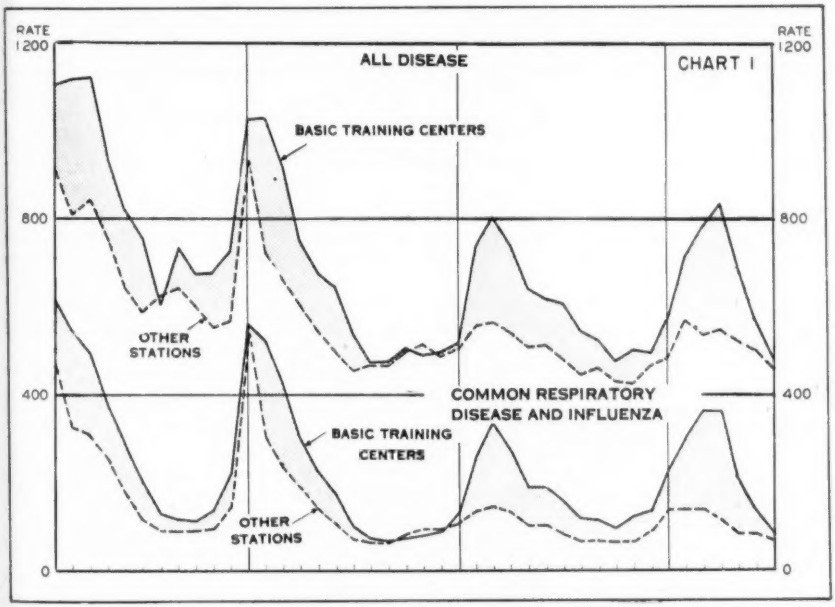
Control of these diseases is particularly difficult, and few specific measures are available. Two such measures which were developed during World War II are: (1) the prophylactic use of sulfadiazine for the prevention of meningococcal meningitis; and (2) vaccination against influenza. (It should be parenthetically stated that epidemic virus influenza is an exception to the statement made above in that it does not attack recruits more frequently than seasoned troops.) Reliance for control of other diseases in this group must be placed largely on physical inspections, early detection and hospitalization of cases, and such other general hygienic measures as avoidance of overcrowding.

Data have been assembled to show the differential in disease admission rates between basic training centers and other stations in the United States during the greater part of the war period. It should be made clear, however, that at times, especially during 1943, the basic training centers included perhaps as little as fifty per cent of the men inducted in the previous three months, for a great deal of basic training was received in units to which many men proceeded directly from

the reception centers. The data on the training centers are also somewhat less complete in the early part of the period studied here. It should be borne in mind that other activities may have predominated even at a post designated as a basic training center. Were it possible to show separately all the basic trainee strength, the differentials shown here would be even larger.

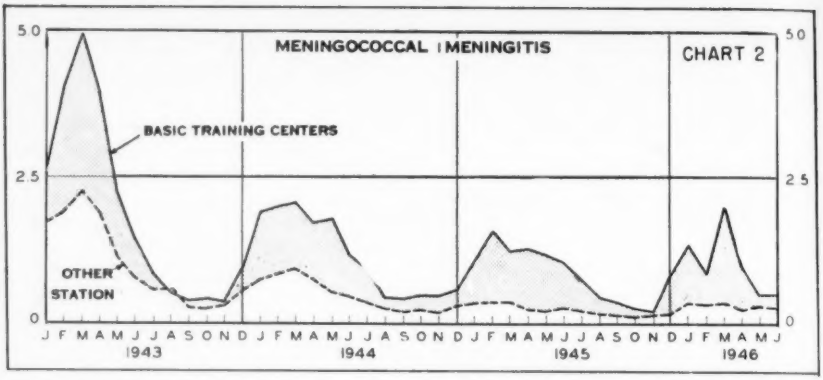
The accompanying charts give the monthly rates (on an annual basis) for basic training centers in comparison with those for all other stations in the United States.* Chart 1 presents the data for all disease and for the common respiratory diseases plus influenza. The area of differences, which is shaded, shows how large is the margin between the two series. Almost negligible during summer months, it usually ranges from twenty to forty per cent for all disease during the winter months, and from fifty to 100 per cent for the common respiratory diseases and influenza. During March 1946 the differential is proportionately greater than in any previous month of the period, fifty per cent for all disease and 220 per cent for common respiratory disease and influenza. It is noteworthy that, during the one frank influenza epidemic experienced by the Army during these years, that of December 1943, there was virtually no difference between the two rates.

Among the outstanding diseases which attack recruits more often than seasoned troops are measles, mumps, scarlet fever, and meningococcal meningitis. Although the existence of the differential is common knowledge, it is not generally realized how



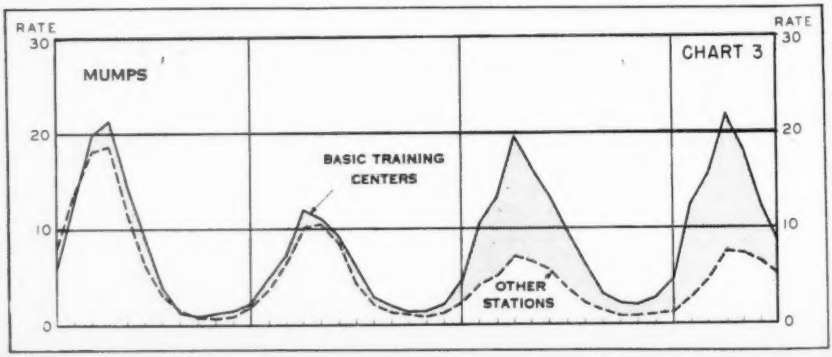
* These rates were computed by the conventional Army method: that is,

$$\text{Admission rate} = \frac{\text{Number of admissions in 4 (or 5) week period} \times \frac{52}{4} \text{ or } \frac{52}{5}}{\text{Mean strength} \div 1000}$$

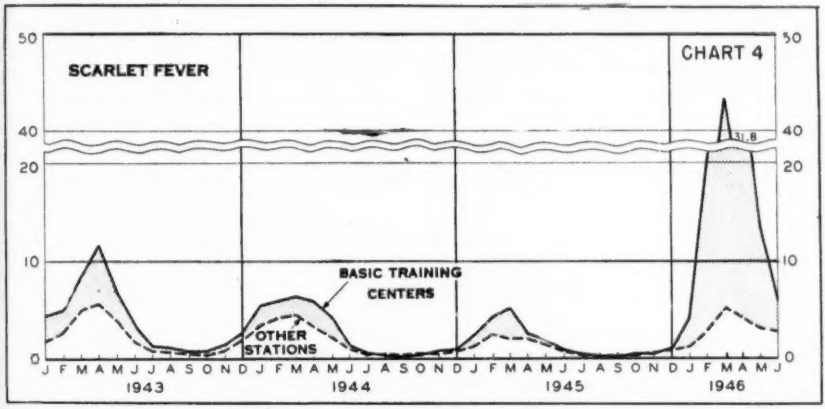

MENINGOCOCCAL MENINGITIS
CHART 2
BASIC TRAINING CENTERS
OTHER STATION
50
25
0
J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J
1943
1944
1945
1946

large it is even for such mixed groups as obtain when one compares basic training centers with other stations. Chart 2 gives the data for meningococcal meningitis. Despite their only partial coverage of the basic trainee population, the basic training centers had rates often more than twice those for all other stations. In March 1946 the ratio was about six to one. Chart 3 presents the series for mumps. It is not known why the differential was so slight in 1943 and 1944, as it became quite large in the two later seasons. Of course the separate reporting of trainee strength is more complete in the last two epidemic periods. In March 1946 the ratio was almost three to one.

In the case of scarlet fever, shown in Chart 4, the differentials in 1943 to 1945 are of moderate degree. In 1946, however, the difference becomes extraordinarily great, requiring a break in the chart to show the February to April points. Most of the basic training centers experienced epidemics of scarlet fever between February and April 1946, and in several camps these epidemics were so severe as to require temporary diversion of the inflow of trainees to other stations. These epidemics were not paralleled by any corresponding situation in the civilian population from which the men were drawn; in fact, during the winter of 1945-1946 the prevalence of scarlet fever in the civilian population of the United States was considerably below the seven-year medium level, and no section of the country experienced any widespread increased in-



cidence. Along with scarlet fever, most of the training centers had epidemics of measles or German measles. While streptococcal sore throat is not reported with sufficient regularity to justify showing its trend, it is known that this condition also increased sharply, probably paralleling the scarlet fever increase. Most of the cases of streptococcal throat infection with a rash are classified as common respiratory disease. Acute rheumatic fever, not shown in the charts, has also increased much more than in previous years.


SCARLET FEVER
CHART 4
50
40
20
10
0
31.8
BASIC TRAINING CENTERS
OTHER STATIONS
J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J
1943
1944
1945
1946

The significance of the data presented above in relation to the Army's training program can perhaps be made more clear by a specific example. In the winter and spring of 1946 a certain training center had an admission rate for disease which continued higher than 1,000 per 1,000 per year for a period of ten weeks. The average admission rate from 19 January to 29 March was 1,400 per 1,000 per year; in this period alone, twenty-seven per cent of the mean strength on the post was hospitalized chiefly for communicable disease. The average number of days lost per disease admission was 8.9 and 242 training days were lost per 1,000 troops due to disease over the ten-week period.

Of the patients hospitalized in this epidemic, as in any epidemic in which streptococci play a large role, a certain number were lost to the Army through permanent disability. Rheumatic fever and rheumatic heart disease are the most common disabilities resulting. At this training center, in the same ten-week period and the following four weeks, 133 cases of acute rheumatic fever occurred; undoubtedly there were other cases among personnel who had streptococcal infections and were transferred elsewhere shortly after their recovery from the initial infections, and before sufficient time had elapsed for the sequellae to appear. Acute rheumatic fever is not a cause for separation from the service, but rheumatic heart disease, which frequently follows it, is.

In the epidemic described above it was finally decided to discontinue the assignment of basic trainees to the training center, in order not to keep up a flow of new susceptibles which would tend to keep the epidemic alive. Add the loss to the training program resulting from this measure to the losses already incurred through illness, and it is apparent how much this could mean at a time when all possible manpower was urgently needed.

The greatest hope for control of the respiratory infections in military organi-

zations consisting of unseasoned troops lies in efforts towards the following objectives: (a) extending the length of the training cycle so as to reduce the rapid turnover of troops at training centers; (b) curtailing the rapid influx of recruits into large training centers in the winter and spring; (c) making provision for temporarily diverting the flow of unseasoned troops to other posts during periods when epidemic conditions prevail at particular training centers; (d) conducting basic training so far as possible at posts in the southern portion of the United States; (e) conducting further bacteriologic and epidemiologic studies aimed at reducing the exposure of newly inducted personnel to infectious agents against which they have not acquired immunity. Such studies assume particular importance in view of the probability that rapid mobilization, even more rapid than in previous wars, would be necessary should another war become inevitable. The facts presented here also furnish an argument for universal military training, since it is probable that men who had been through a period of six months' service under U.M.T. would be largely "seasoned" from the standpoint of respiratory infections.

One lesson of the war, forcefully driven home to all of us, is that the proper and efficient allocation and employment of the Nation's manpower is probably the most difficult and complicated problem of modern war. Of all of the materials of war, man is the most critical, the most important, and the one indispensable item—the only item in which there can be neither increase in production, nor improvement in quality once we have entered war.

Major General Miller G. White

MILITARY NOTES AROUND THE WORLD

GREAT BRITAIN

First Jet Flying Boat is Built in Britain

First jet flying boat, a twin-engine, high-wing single-seat fighter being built by Saunders-Roe, Ltd., of Great Britain is expected to be in the 500 miles per hour class.

Designated the SR/A1, it will be powered by two Metro-Vickers F2/4 axial flow jet units each of 3,500 pound static thrust. Air intake is through an opening in the nose of the hull which feeds to the two engines located in the fuselage. Gases are expelled from nozzles aft of the wing roots.

Tank testing is claimed to have shown the bow opening is free from adverse spray effects under normal operating conditions. A simple trap prevents entrance of water into the intake.

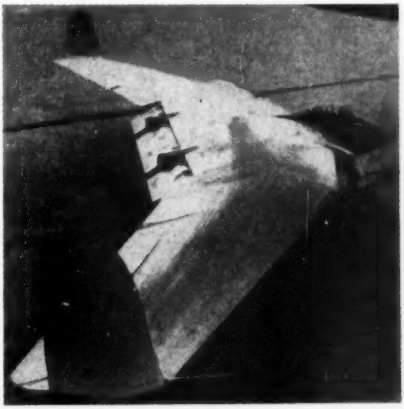
The Saunders-Roe boat has a span of 46 feet, length of 50 feet, and height of 17 feet. Wing area is 415 square feet.

(Aviation News)

Britain's Flying Wing Twin Jet

Armstrong Whitworth AW-52 is powered by two Rolls-Royce Nene I turbo jet engines. A two-place, all-metal prototype of a large trans-Atlantic jet commercial transport, AW-52 is not a true all-wing craft, having a small pressurized fuselage. Power units also cause bulges below wing contour.

A second version of the AW-52 is now being built. This will use two Rolls-Royce Derwent engines, in place of the Nenes, in order to encase the engines completely within the wings. The Derwent, developing 3,500 pound static thrust, is seven inches smaller in diameter, and thirteen inches shorter than the Nene.



(Aviation News)

AUSTRALIA

Repaying Natives for Wartime Help

Friendly natives who assisted British and Australian prisoners of war during the infamous "death marches" conducted by the Japanese at Sandakan during the latter stages of the war will be paid for their help in the near future. An Australian army officer will retrace the route of the marches soon to pay natives who helped the prisoners. The grim story of the Sandakan death marches was made known in 1945 after Borneo was captured by Australian troops following a hard fought campaign. Of more than one thousand Allied prisoners compelled by the Japanese to make the marches only a handful survived the gruelling, 120 mile treks.

(*Australian Weekly Review*)

INDIA

Engineer Demobilization

Since VJ-day more than 132,000 men have been released from the Royal Indian Engineers. A total of 600 Engineer units have now been disbanded.

In 1939, the RIE consisted of thirty units with a total of 10,000 officers and men. During the late war, the Corps expanded to over 700 units with a strength of nearly a quarter million men.

(*Indian Information*)

JAPAN

Underwater Suicide Corps

Use of underwater attack troops, equipped with special self-contained diving suits, submerged foxholes and fixed underwater torpedo installations built into the hulks of sunken vessels were part of the plans of the Japs for a last-ditch defense of such areas as Tokyo Bay, Yokosuka, Kure, and Sasebo according to the final report of postwar investigation by the United States Naval Mission to Japan.

The *Fukuryu*, or underwater attack units, grew out of the decision made in 1944 at the anti-submarine school, that an American invasion of the homeland was to be expected within a year, the reports revealed.

As a landing on the homeland became more imminent, interest in this project increased. The final program hinged around the use of the two chief products of the development program: the self-contained diving suit and the attack mine.

The self-contained diving suit was equipped with two tanks, each holding 3.5 liters of compressed, pure oxygen. The chemical air purification device was similar to that used in submarines. A liquid food was developed, to be used by the diver by means of a rubber tube. It was reported that, after a short training period, a man could easily maintain any desired depth, could move along the bottom at 2,000 meters per hour, and manage torpedoes.

The attack, or suicide mine was essentially a charge of explosive mounted on a stick equipped with a contact fuse. Immediately behind the charge was a floating chamber. The weapon could be balanced so that it was readily handled under water. Its use was simple. The diver rammed the front end against the bottom or side of a boat. He would be of course, destroyed. Hence, the *Fukuryu* were the underwater equivalent of the *Kamikaze*.

In the early stages, the *Fukuryu* personnel were all volunteers recruited from air corps trainees. Later, conscription was introduced. At the end of the war the force was about evenly divided between volunteers and draftees.

It was planned to have a total of 6,000 men in this branch by 30 September 1945 and to be completely ready for combat on 15 October.

Three underwater torpedo positions were reported to be in the entrance to Tokyo Bay. These positions consisted of water-tight compartments built into non-

operative merchant vessels which were then sunk in position.

Men were taken out to the stations in boats and lowered to the underwater positions in diver's suits. They entered through a water-tight door and after their entrance the remaining water was pumped out of the position.

Each pillbox had a floor space of about 1,440 square feet and provided accommodations for forty to fifty men. The station was equipped with sound detectors and three torpedo tubes. Supplies were kept on hand for a period of ten days and provisions were made to resupply when the men were rotated.

Communications between the various stations were maintained by tapping out code messages on the walls which were carried through the water and which could be picked up by occupants of other pill boxes.

The Navy mission reported that it had made a search for the suspected installations and came to the conclusion that it had located some of them in depths of about 180 feet of water.

(*Army and Navy Bulletin*)

GERMANY

Autobahns for Airfields

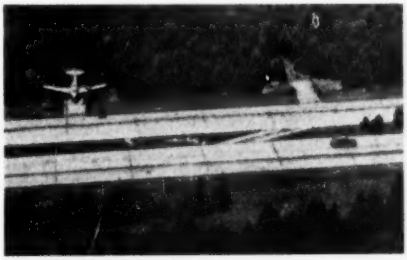
During the period from the Nazi accession to power in Germany until the outbreak of the war with Poland, articles frequently appeared in the press describing in detail the construction of the network of super highways, called *autobahns*. No article was complete without reference to the possibilities of the use of these highways as auxiliary airfields.

In March 1945, when the crossing of the Rhine was effected, first-hand evidence was obtained that the Germans were not only planning increased use of *autobahns* as auxiliary airfields but in some instances had them in operation for combat aircraft.

Of eight known *autobahns* prepared for utilization as runways, four were in operational use during the war.

The general characteristics of all strips were the same. As originally built, the *autobahn* consisted of two traffic lanes, each seven and one-half meters in width, with a center island five meters in width, or a grand total of twenty meters between shoulders. To convert this roadway for use by aircraft, the center island was dug out, and a slab of concrete poured over a crushed stone base.

With some exceptions, it appears that the selection of the *autobahn* airstrip was determined primarily by its proximity to an existing air installation. The



general scheme was to pick a section of the *autobahn* approximately a mile and a half in length which was then connected to an existing airfield by means of a taxiway or converted road. Many of the safety features considered essential for normal aircraft operation were sacrificed.

It is a commentary upon the effectiveness of Allied airpower that the Germans should be forced to rely upon or plan such extensive use of facilities which would not meet normal operational criteria. However, factual evidence seemed to indicate that relatively few accidents occurred from the use of such limited facilities. Apparently with the jet aircraft that were being operated, operations could be successfully continued without abnormal non-operational aircraft wast-

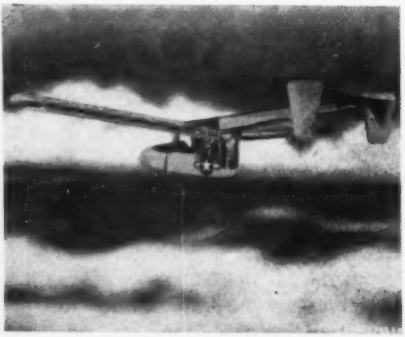
age. For this purpose it is evident that the *autobahn* runways served their purpose.

However, it is also evident that the German Air Force, contrary to rumors, before the war did not place much reliance upon this expedient and had only seriously begun to plan widespread use of *autobahn* runways when the overwhelming superiority of the Allied air force made the permanent airfields untenable.

(*The Military Engineer*)

UNITED STATES

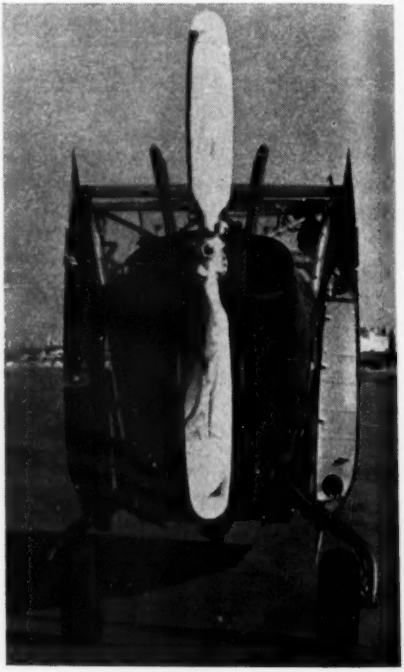
New Liaison Planes



L-15A. (AAF photo.)

The Boeing L-15A, pictured above, is a new liaison plane ordered for the Army Ground Forces. The craft is easily adaptable for observation, communication and photographic work. It is of all-metal construction, with full cantilever type landing gear, attachments for floats, skis or a Brodie type gear for cable landings. It may be towed in glider fashion, also. The plane has a wing span of forty feet, weights 2,050 pounds, and has a 125 horsepower Lycoming engine.

Another new liaison plane, the L-13 is also all-metal, has folding wings and adjustable landing gear to permit towing over rough ground or narrow roads. It has a wing span of 40½ feet, is 32 feet long and weighs less than a ton. Powered by a 425 horsepower engine, it can take off in 230 feet, or may be towed aloft glider fashion and released



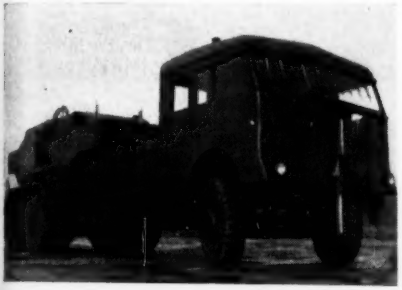
L-13. (AAF photo.)

on its own power. Skis or floats may be readily adapted to the versatile landing gear. (AAF Photos).

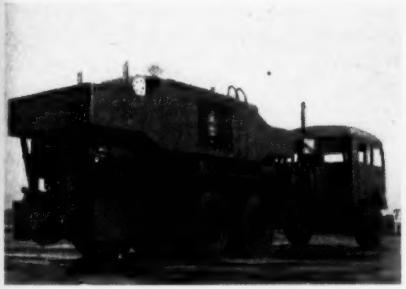
Dynamometer, Supreme Tester

Called the Army's supreme tester, designed to measure and record all the factors of traction and power of vehicles from the smallest road type to the largest tank, the mammoth mobile dynamometer is now in use at the Aberdeen (Maryland) Proving Ground. The machine, pic-

tured here, was derived from the M-26, tank recovery tractor, and the T-23, medium tank. The precision and versatility of this laboratory on wheels is described



as rivalling that of stationary dynamometers. In operation, the dynamometer can find the amount of energy lost due to friction by towing a vehicle being tested, or it can measure the other vehicle's



tractive and power characteristics by having the other vehicle tow it. The machine is forty-four and a half feet long, without the sensitive draw-bar attachment, and will absorb 60,000 pounds pull, up to four miles an hour, and 6,500 pounds pull at forty-five miles per hour. The vehicle is propelled by two five hundred horsepower Ford V-8 engines, the same used in the General Sherman tank. Power is transmitted to the drive wheels by electric drive units, which provide the current to operate four propulsion motors.

(*Aberdeen Proving Grounds*)

Blast-Driven Earth Rod

Utilizing the recoil action which results when a charge of powder is ignited in a firing chamber, explosives experts of the Engineer Board, Fort Belvoir, Virginia, developed a device with which small holes can be made in the ground quickly for various military purposes.

Figure 1. Blast Rod in firing position.

The invention, which also promises to be of great use in helping to solve numerous civilian engineering problems, is the Blast-Driven Earth Rod. It can be taken by foot soldiers into mountainous or swampy areas inaccessible to truck-mounted, earth boring equipment. Holes of the same dimensions as those made with the power-driven earth auger, for example, can be made with it in about the same length of time.

The blast-rod operates on the same principle as a cannon. A smokeless powder charge is used. When it is ignited in a firing chamber the resulting recoil action drives a steel rod into the ground.

Figure 2. After charge has been fired.

The device has been tested and found satisfactory for a wide variety of jobs. Holes for the placing of poles, telephone poles, and cratering charges can be made with it. With simple attachments the blast-rod also can be used to drive anchorage posts and piling. As an expedient method the firing chamber can be used for projecting cables across streams or chasms.

(*The Military Engineer*)

World's Largest Air Transport

The AAF XC-99 (below) is designed to carry 400 troops, 335 litter patients, or 100,000 pounds of cargo. Built by Consolidated-Vultee Aircraft at San Diego, the huge plane is shown outside the plant where it had to be moved for installation of landing gear and outer wing panels. The plane is a cargo version of the AAF B-36, is double-decked, has a 230 foot wing span and is 182½ feet long. The vertical stabilizer is 57½ feet high. Power is furnished by six Pratt-Whitney, 3,000 horsepower, pusher type engines, turning nineteen foot reversible pitch propellers. Gross weight of the air giant will be 265,000 pounds. With reduced loads, the transport will have a maximum range of more than 8,000 miles at speeds in excess of 300 miles per hour.

For flights of this distance, a crew of five, and an equal number of relief crewmen, will be required. (AAF Photo)

(Bureau of Public Relations release)

New Army "E" Ration

As a substitute for the familiar "C" ration, the War Department has adopted a new "E" ration, following extensive tests. The caloric content of the new ration was increased to 3,800 for one day's consumption by adding one meat item. The new ration comes in a package weighing five pounds, three and one-half ounces, containing seven cans, one accessory packet and one package of cigarettes. One of the cans contains white bread, three contain meat, two contain biscuits, and one contains fruit. There are also tablets for purifying drinking water and chemical tablets to heat food and drink.

(*The New York Times*)

FOREIGN MILITARY DIGESTS

The Ministry of Defense

Digested by the MILITARY REVIEW from an article by Major General H. Rowan-Robinson in "The Fighting Forces" (Great Britain) December 1946.

THE Government is to be congratulated on the creation of a Ministry of Defense and with having thereby resolved a most complex problem. Gone are the days when special commissioners had to accompany an expeditionary force in order to keep the peace between admiral and general, reporting early of a relationship "sweet and hopeful" but later condemned to see the enterprise ruined through the quarrels of the leaders. Gone, too, the days when Lord Haldane could say that, on the question of aircraft carriers, "it took four months of very hard work and peaceable talk, such as only a civilian could have administered, to bring the Navy and the Air Force to an agreement." Gone, even the days when combined action was on every lip, yet, in the Chiefs of Staff Committee, formed expressly to give expression to that need, an ex-Chairman of the Committee felt compelled to write to *The Times* that "unanimity had been too often reached by tacit agreement to exclude vital differences of opinion, to avoid issues on which such differences might arise."

The highlights of the new system are:

(1) That defense is to be treated for the first time as a single problem "in the light of the economic position and the strategic requirements of the country."

(2) That the three services are to be handled, not through improvization but through organization, as a single instrument of war—procedure which accords with the views expressed by virtually all the principal Allied leaders—military and political.

(3) That a clear division is made between the respective duties of the Prime Minister and the Minister of Defense—the one to be responsible for defense in all its aspects, to be Chairman of the Defense Committee and to control, in connection with defense, all departments contributing to that end; the other to exercise control over the fighting forces and their supply, and to consolidate their departmental activities in preparation for war.

(4) That the Minister of Defense should apportion all available resources between the services in accordance with the strategic policy laid down by the Defense Committee, thus putting an end to the scramble for manpower, money and equipment formerly prevailing.

(5) That the Chiefs of Staff should retain their responsibility as professional advisers to the Government and, though as a committee under the control of the new ministry, they should have direct access to the Defense Committee and the Cabinet.

(6) That a high priority is given to scientific research and that its organization is framed "to give continued and

complete integration of military and civil thought of all levels." A committee drawn from responsible elements in the Service Departments and the Ministry of Supply with a leading scientist as chairman has been formed to advise the Government on the subject.

(7) That an example is being set for the control by a senior ministry of other ministries of a similar nature which, if followed, might tend towards better efficiency and economy and at the same time reduce our swollen Cabinet.

(8) That Home Security, embracing as it does so many civil as well as military departments, should not be a function of the Ministry of Defense but should be linked to broad defense policy in the Defense Committee. This was a particularly refractory problem; and, by and large, the decision taken appears to be sound.

(9) That the Government has decided against the formation of a "Combined Staff" which many advocates (including the writer) of a Ministry of Defense urged. They based their decisions on the working of staffs, both Allied and German. As regards the Allies, however, only the working of the staffs at the headquarters of the main theaters of operation is relevant and in that the evidence is strongly in favor of their judgment. German procedure, however, affords no sound foundation for the decisions. The German General Staff, for many decades the model to the world of its kind, nearly succeeded in winning the war and was eventually beaten as much by superior force as by skillful direction. It was, moreover, heavily handicapped by the persistent intrusions of Hitler. The Government had a difficult decision to make; but, avoiding as they do, the danger of cleavage between planning and execution, again appear to have come down on the right side.

(10) That the Government does not regard their solution as final but as a step forward in the process of evolution.

So much for the good points of the new system. They are so good that they override all likely objections and should yield an abundant harvest, both of efficiency and economy.

One objection sure to be raised is that Mr. Churchill, in the most recent of wars, managed to exercise control of defense without a ministry. It must be remembered, however, that he was exceptionally well qualified for the task. He had occupied the posts of First Lord, Secretary of War, and Air Minister, and had been a professional soldier. He is, moreover, a man of powerful personality and, as he exults in strategic direction, would have brooked no rival or ministerial associate in that sphere. Thus, if we accepted him as Prime Minister, in which post he was unquestionably indispensible, we had to take him on his own terms. He was also nobly served by Chiefs of Staff who were not alone highly capable but also cooperated perfectly as a team.

Had Churchill died we should have had neither a man nor a system to replace him adequately. That fault has now been remedied. The Prime Minister of the day, relieved of much of his burden by the new Minister, will now be able, without detriment to his other duties, to discharge the overall responsibility for defense.

Now for the weak spots to which comment and criticism may be addressed with a view to assisting evolution to move on sound lines.

According to the White Paper, the Government is satisfied that there are no grounds for a drastic re-cast of the existing organization. They regard the changes introduced as the consolidation of advances made in coordinating machinery in recent years "under the compulsion of war or the threat of war." This statement is not of happy augury. It admits that progress was due, not to reason,

but to the onset of events, and it ignores the fact that failure to introduce central control earlier nearly involved us in calamitous defeat in two global wars. Moreover, the White Paper envisages further evolution largely in terms of the past, whereas in a world seething with the possibilities imminent in atomic bombs, long-range rockets and radio-active poison gases, it should look at least as much to the future.

As a second point, the new system might well be improved by the appointment of a Chief of the General Staff (alternatively, a Commander in Chief) who would attend all meetings of the Chiefs of Staff Committee, preside over them in the absence of the Minister of Defense, and issue operation orders and directives on broad lines, based on the appropriate authority.

Such an appointment would indeed imply an extra link in the chain of command; but, on the other hand, it would (a) facilitate the execution of revolutionary changes in organization as and when demanded by revolutionary changes in weapons; (b) provide professional coordination of the views of the Chiefs of Staff; (c) insure the employment of the three Services as a single instrument; (d) save time in arriving at decisions and eliminate those faulty compromises liable to be forced upon the Committee in order to attain agreement; (e) eliminate the need for a Chief of Staff Officer to the Minister of Defense, whose duties, though brilliantly performed by General Ismay during the war, are anomalous and invidious.

As a third point, the White Paper should either have omitted the discussion of collective security altogether on the grounds that it is a political rather than a military problem, or it should have dealt with the subject more fully, especially with regard to Imperial defense. As its treatment stands, it looks as if the need for mention had occurred to the writer as an afterthought. Imperial defense has indeed become a much more complicated matter than of old. Imperial unity carried us through two global wars; but for long, we trod the cliff-edge of disaster. Had we just failed instead of just succeeded in the Mediterranean or had South Africa proclaimed herself a neutral, our whole edifice of security would have crashed. Our main trouble was that we were terribly slow in developing our potential strength, and a repetition of that fault can no longer be permitted in an age when instant readiness may afford us the sole hope of survival.

These considerations have suggested the formation of regional groups of states connected politically, economically and through proximity—groups much more closely knitted in space than are the constituents of the Empire.

Such groupings are, of course, open to objections. They might, for instance, loosen the ties binding the Motherland to the Dominions. But the main object of defense is the survival of the Empire with liberty and ideals unimpaired, and a temporary loosening of bonds might prove acceptably sound were it likely to achieve that result.

Incidentally, as there are to be permanent members of the Defense Committee, surely the Dominions Secretary should be among them.

A last word. The establishment of a Ministry of Defense will enable us to handle our power with far greater efficiency and economy of old, and we may, therefore, rejoice in its approaching birth after so long a period of gestation. But it must have an instrument to handle. The men to form the forces to be directed by the Ministry have yet to be found, and the lack of them is becoming increasingly dangerous. Great armies, navies and air forces cannot be built in a day. They are long-term creations.

What Will Be the Air Strategy of Tomorrow?

Translated and digested by the MILITARY REVIEW from a French article by General L. M. Chassin in "Cahiers Politiques" (France) October 1946.

THE recent war worked a profound revolution in military technique. In all fields, especially in the air, new weapons were devised whose employment is little understood but whose existence gives rise to world-wide uneasiness. That "constant factor" which always opposes armor to a projectile and a means of defense to a means of attack has not had time to operate. Since peacetime experiments can never be wholly valid we notice considerable uncertainty in the writings of the strategists who speak of wars of tomorrow.

All of them agree that "some form of air power" will decide future wars. General Spaatz and General Arnold have both declared that the victory will be won "before surface forces have established contact with the enemy." But what will be the form of tomorrow's air power? What world strategy will it require?

Considered from the aeronautical point of view, the last war witnessed both a rapid evolution in old matériel and a sudden appearance of new matériel. The evolution that occurred in old matériel resulted in considerable increase in the speed and power of planes. The speed of fighter aircraft was stepped up from 400 to 800 kilometers per hour, while their radius of action increased. The P-51 Mustangs, for example, could take off from Iwo Jima, accompany superfortresses to Tokyo, 1,300 kilometers away, and return to their bases. Their fire power was also increased ten-fold. Bombing planes followed the same course. Their speed rose from 300 to 600 kilometers per hour and they are now able to carry five tons of

P-51s equipped for long-range missions. (U.S. AAF photo.)

explosives to a target 5,000 kilometers away and return to their bases. We must also include the perfection of aeronautical accessories, especially the development of radio which permitted navigation and bombing with considerable precision without visibility of ground or target.

This evolution led the air forces to an increasingly important role in ground and naval operations, and to independent operations whose aim was the exhaustion of the enemy by striking at his industrial power, communications and major centers. But this evolution was a normal one. It left aircraft with the same general characteristics as in the days of Bleriot and Latham, engines and fuselages becoming only more and more powerful and heavy, respectively. One could already perceive a tendency toward increased mechanization of the tasks which formerly were specifically human, such as the automatic pilot functioning better than a man, and the electrical eye seeing farther and better than he.

The first evolution of importance was the appearance of the gas turbine, and that of the reaction motor. The gas turbine, long the object of theoretical study, was not practical up to the present due to the absence of light alloys capable of enduring high temperatures. This metallurgical problem has today been solved. It is now possible to provide all planes with a motor with certain advantages, but with some as yet unsolved disadvantages.

Between jet-propelled aircraft and aircraft of the V-2 or rocket type, there is a great difference. The former may continue to be conceived and organized in the classical manner. Still manned by men, it will comprise defense, tactical and strategic aviation. Only the performance of the planes will have changed.

Aviation of the V-2 type, on the contrary, no longer requires personnel for navigation. No more pilots, navigators, radio operators, bombers or machine gunners. The aviator becomes an artilleryman, regulating the departure of the projectile, then following it by television and guiding it by radio to the vicinity of its target after which the projectile itself will select its own target.

It may be imagined that the wars of the future will begin by terrifying attacks on the large cities of the enemy by swarms of missiles of the V-2 type and that if the attack is sufficiently hard the fighting spirit of the adversary will be broken. But it can also be imagined that in the second following the arrival on the ground of the first of the robots, the adversary himself will press a series of buttons which will send his reply against the cities and terrain of the aggressor.

In the face of such possibilities it is easy to understand why the ministers of the British Crown and their dominions have made the dispersion of key industries and rapid evacuation of cities a matter of first priority. Against the attacks by V-2 projectiles charged with atomic explosives, there are, in fact, but four defenses: dispersion, burrowing into the ground, destruction of the enemy's missiles, and reprisals.

It must not be believed, however, that initial operation of the new weapons will be attended by less difficulties than in the case of the old ones. Phenomenal consumption of fuel will render the fuel problem more acute than ever. Also, the manufacture of robot devices is a complicated task, and there will doubtless be an endless number of types developed. It might, at least, be hoped that this new strategy would do away with large armies, but, unfortunately, we must not count on this. The problem of occupation will always exist, organized forces will appear, and perfected forms of guerrilla warfare will develop.

Lastly, the war with the robot weapons finished, another war will begin the mo-

ment it becomes necessary to break the will of the vanquished people and to take from them the means of manufacturing engines of destruction. This period required for the disarmament of the enemy may be the longest and most difficult. The ground methods of the past will then be resumed. After the initial and extremely brutal blow, the remainder of the war will represent the dying agony of the nation.

V-2 Rocket. (Signal Corps photo.)

In such conflicts, air forces will appear at the outset for putting into operation remotely controlled weapons. Doubtless all strategic weapons will be under the control of the air forces, and they will appear afterwards as means to transport men and supplies from one continent to another.

What transportation aviation did in the last war is well known. It rendered possible the supply of garrisons and of entire armies that were surrounded: the Germans at Staraya Russia during the winter of 1941-1942; the English at Imphal in 1944; the Americans at Bastogne during the von Rundstedt offensive in the Ardennes, and Wingate's forces in Burma. It permitted ultra-rapid concentration of troops and the shifting of forces to the point of main effort of a disposition, leading to decisions, as in Tunisia in 1943 and in India in 1944. It permitted hitherto inconceivable exploitation of breakthroughs, tanks and combat teams being supplied with fuel and ammunition by air as in Poland in 1939, in the Caucasus in 1942, and during the German campaign of 1945. Transport aviation, alone, maintained contact between China and her Allies during the long years when the Burma road was cut.

In concluding this glance into the future, we are able to distinguish two very distinct phases in the development of the air arm: the first is that of reaction-propelled machines for military use; the second is that of remotely controlled or automatically controlled robots. The great nations must take into account this inescapable development.

At the present moment, as an aerial fleet powered by reaction type motors is being built, the type of engine that won World War II is being discarded. The new equipment offers problems of employment that are entirely peculiar to it alone, and which contemplate an air strategy quite unrelated to that of the last conflict.

Reaction powered aircraft, as a matter of fact, require very long runways for taking off, and have an enormous fuel consumption, which is not due to motor inefficiency, but is, rather, the price paid for the speed of this type of aircraft.

In view of these peculiarities, we see that the aircraft of tomorrow will need well constructed bases with long firm runways, and fuel storage depots of great capacity. When we finally arrive at the robot period, the aerial base will have lost a large part of its importance. Launching platforms may be built to face any part of the world. Between 1937 and 1941, German engineers had conceived a rocket-propelled bomber which, rising to

a height of eighty-five miles, would cover a distance of 12,750 miles with 750 pounds of explosive and at an average speed of 8,000 miles per hour! The construction of such weapons is within the realm of possibility. In aviation, the dreams of today are the realities of tomorrow. The conquest of the air in a quarter century of time has made more progress than that of the surface of the sea in thousands of years.

Bases

The requirements of a modern air base show how costly such a strongpoint would be. But let us not forget how much a Singapore or a Gibraltar cost. If the base fulfills its role, as was the case with Gibraltar or Malta, this money spent is not badly placed. It is necessary that the base be well planned and well constructed. As the American budget committee wrote: "The time has come when a certain number of bases must be carefully established in selected places in order to render possible operations of long duration. We cannot content ourselves with what was rapidly constructed during the war when it comes to meeting the requirements of operations of such a nature."

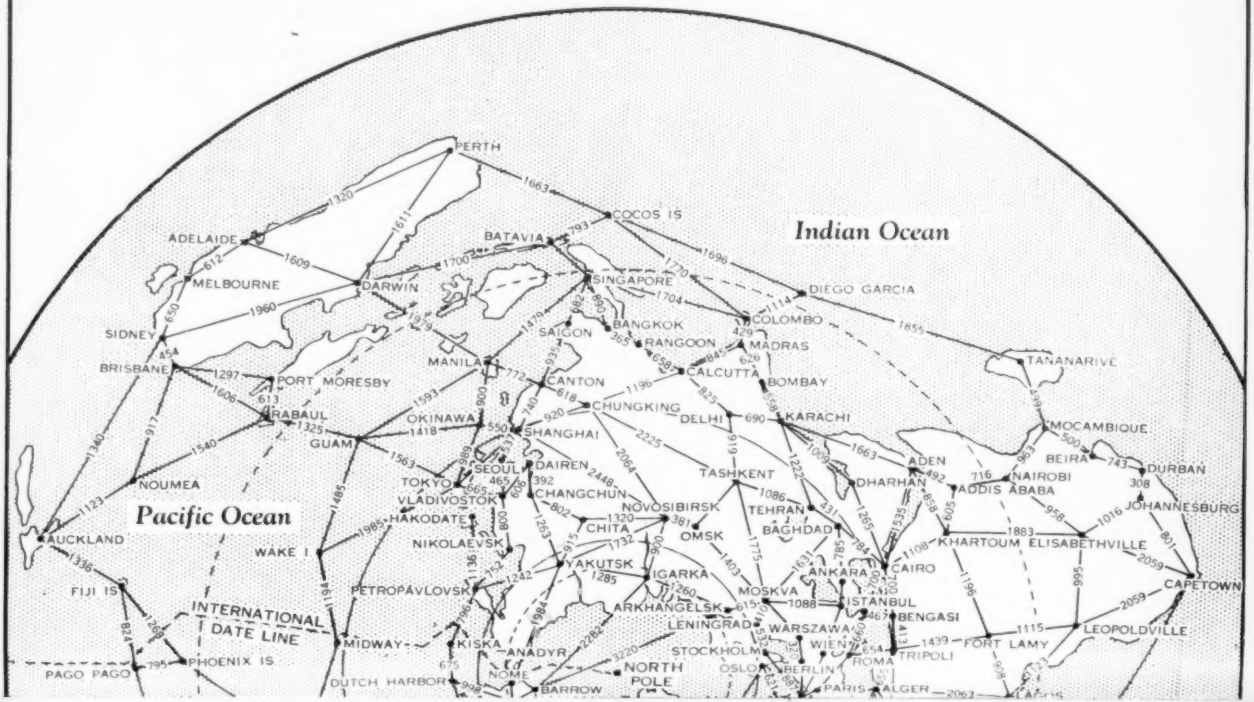
From the geographical point of view, the strategic air base must permit deep attacks of enemy territory, yet at the same time, it must be conveniently connected with the rest of the national network. At the beginning of the Pacific operation in 1942, Wake Island succumbed because it was too loosely connected with the remainder of the defense network; Midway, on the contrary, held, and doubtless aided in the winning of the war.

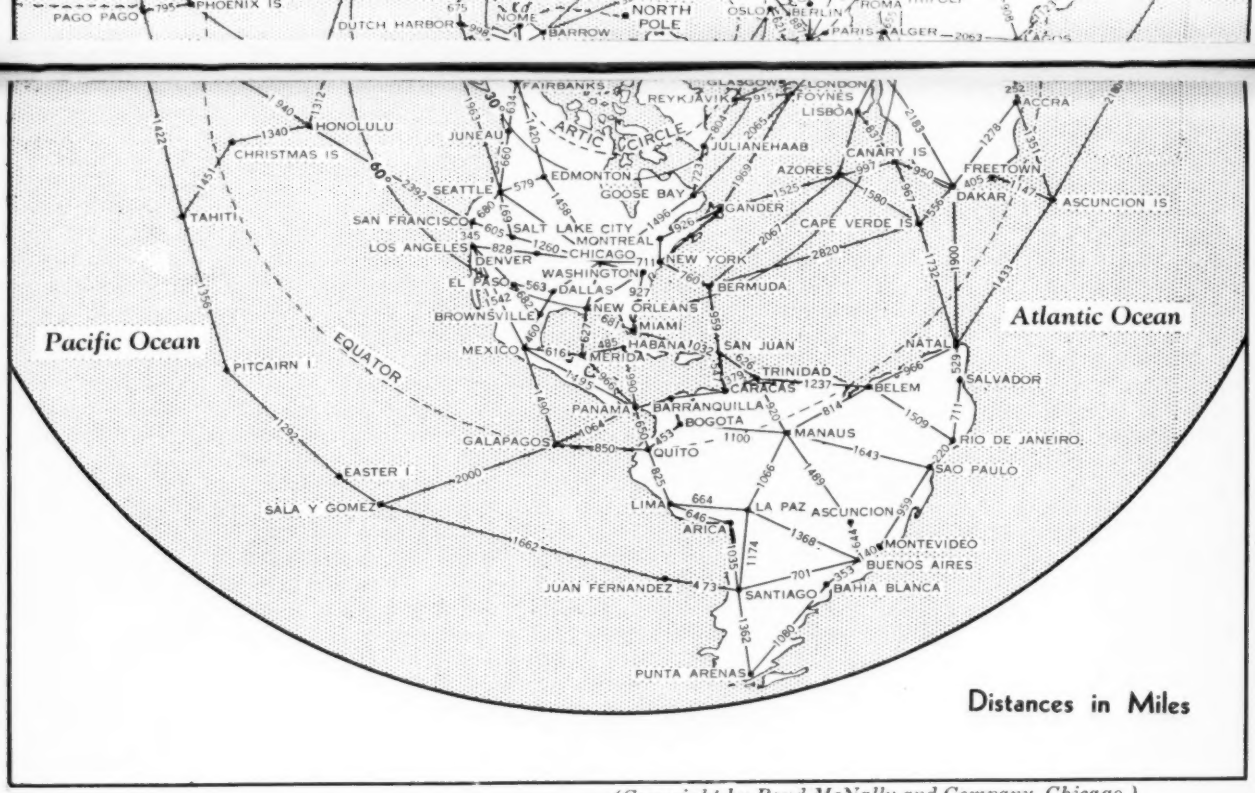
For a country like the United States, which is continental, advanced air bases must be very far away. The role played by Greenland and Iceland during the last conflict is familiar to all, both with respect to the antisubmarine warfare and the convoying of American fighter aircraft over the northern route. Similarly, in the southern hemisphere, the utilization of the Azores, Dakar, and Ascension Island, permitted the successful combat of German submarine packs as far away as the Cape of Good Hope, and the passage of a considerable stream of airplanes to the Middle East.

According to numerous official statements, it appears that there does indeed exist an American policy with regard to bases. According to General Spaatz, these must, of necessity, be offensive in their nature, since, if defensive, they represent but a dispersion of forces. If offensive, they represent a saving of time, varied angles of attack and facilities for making weather observations.

According to the chief of the American air forces, a well conceived plan of defense would comprise, in the northern hemisphere, Okinawa, Saipan in the Marianas, the Aleutians, and bases in the North Atlantic, doubtless in Nova Scotia, Laborador and Greenland. According to Walter Lippmann, the radius of American defense extends to the line running from Greenland to Brazil, and from Alaska to the Philippines. According to George Weller, author of a book entitled, "Overseas Bases," the U.S.A. should, if possible, retain bases in Sardinia as well as in Iceland. On the Asiatic continent the American author attaches first importance to the Ceylon—Singapore—Rabaul area and to Iran and the Persian Gulf. In all these regions, in fact, the Americans already possess great interests and have carried out extensive projects. During the war, their Air Transport Command (ATC) established, throughout the entire world, some 450 large bases and 925 air fields costing close to two and a half billion dollars. In 1944 a plane crossed the Atlantic every nineteen minutes, and the Pacific every fifty-one minutes. Every day the ATC covered close to two and one-half million miles.

WORLD AIR CENTERS AND FLIGHT DISTANCES





(Copyright by Rand McNally and Company, Chicago.)

At the time of the demobilization of the Army Air Force, the ATC announced that it was obliged to discontinue a large number of its lines and bases. To prevent so useful and perfect an organization from dying, private American air transportation companies decided to pay, from their own private budgets, thousands of employees, and will thus be able to continue to operate this system.

The great American Republic is, therefore, in a good position to create a peaceful system of commercial bases which in time of war could permit them to push their air forces to a threatened sector quickly.

The British Empire, for its part, still possesses an excellent network of bases connecting the British Isles with all its dominions over-seas and with innumerable colonies. If the loss of Egypt comes to be heavily felt by Britain, plans are already being elaborated for making Cyprus a great English base in the eastern Mediterranean. The lesson of Singapore must certainly have been understood.

Importance of Arctic Regions

The Arctic regions are assuming a place of extreme importance in the thoughts of the great major staffs. To quote the words of General Spaatz: "Provided with bases close to the Arctic area, an enemy could attack the most important cities of the United States and, inversely, American bombing forces, located close to the 65th parallel of north latitude, could carry out reprisals of the same nature against the most important centers of population of any possible enemy."

General Spaatz invites us to look at a map of the world. We immediately perceive that the northern hemisphere contains all the great industrial nations of of the world. More than that, below the 30th degree of north latitude (with the exception of China), not a single important industrial city is to be found. The 30th degree of north latitude passes through California, New Orleans, Agadir, Suez, Bassorah, northern India and Nanking. All the great industrial nations, the United States, Germany, France, England, the U.S.S.R., Japan, and northern China, are north of this parallel.

With the planes of tomorrow attacking all the large industrial cities of the world, it will suffice that they be based at the 60th parallel of north latitude, and passing over the Pole, descend on the other side. It seems, therefore, that the Arctic regions, as long as we are in the era of planes with wings, possess an importance of the first order.

The shores along the Arctic ocean are in the hands of a small number of nations. From Petsamo to the Bering Strait, that is to say, all along the northern coast of Asia, these shores are, for a distance of more than 6,000 kilometers, Russian territory which has already been explored. Airdromes have been established during voyages of exploration, and even a regular airline (the most northern in the world), crosses the mouth of the Enisei River and the delta of the Lena and terminates at Anadyr on the Bering sea. The most northern point of this shore line is Cape Tchelionskine which reaches a latitude of 77° 30′. But in this region, Franz-Joseph Land is north of the 80th degree of north latitude as is Norwegian Spitzbergen whose strategic importance is also growing.

Opposite these areas, the Arctic lands are held by the Danes, the Canadians and the Americans.

The Danes own Greenland, an immense continent, whose interior is covered with ice but a part of whose coasts are without any great amount of relief, even in the extreme north, and are free of ice and snow. Greenland, obviously, offers few possibilities for the establishment of air bases. Nevertheless, English, German and other explorers have shown that it

would be possible, if necessary, to construct runways at least as far north as latitude 76° or much farther north than Iceland. Peary's Land, itself, which reaches 83°, would present interesting possibilities.

The Canadian areas, Great Land, the Perry archipelago, and Banks Land, are also extremely barren, but their relief, not their climate, presents the insurmountable obstacles. Already ATC bases exist at Cape Bluff, south of Baffin Land and at the northern outlet of Hudson Bay.

The two principal enemies of aerial navigation in the Arctic regions are storms and fog. The last of these has been overcome by installations of the FIDO (Fog Intensive, Dispersal of) type and by the use of radar. As for storms, though they are frequent in the winter, they are no more so than in northern Europe and Asia. In time of war, however, they represent a hazard.

In the sector—of which Wilkins wrote in 1928, "The Arctic is destined, soon, to become one of the leading factors relative to commerce, war, and international communications. With the development of aviation, it becomes the center of the world, with all the great nations surrounding it in a circle"—the United States possesses only the little battlement of Alaska, but it is especially well placed.

At the cost of inconceivable effort, the Americans constructed a magnificent highway from Edmonton to Fairbanks which will provide the Alaskan bases with a communication line superior to any other Arctic base.

In order to deliver to Russia more than 5,000 bombers and fighter planes, the U.S. opened an air line running from Grand Falls, Montana, to Nome on the Bering Strait, passing through Fairbanks. Parallel to this polar line, a coastal line operated by the ATC joins Seattle to Attu at the extremity of the Aleutians. The two lines are connected by a branch line running from Fairbanks to Anenorag. Further eastward, a third (Canadian) line runs from Grand Falls to Fort Norman on the Great Mackenzie River and on to Port Radium.

The northwest portion of the American continent is, therefore, already well prepared for any air development that may occur. It possesses the basic requirement of radio installations, so necessary at the present day. Alaska, with the icy wastes of Canada, has become one of the greatest air regions in the world. For, after all, it is distance that counts, and this is well explained in the words of Wilkins, quoted above. The Arctic washes the shores of all the great nations of the earth. The route from Moscow to San Francisco (10,800 kilometers), which was followed first by Chelakof and Gronov in 1937, passes over the pole and over Great Bear lakes.

The base closest to Moscow for the Americans, outside of Iceland, is situated near the mouth of the Mackenzie River, close to the frontier between Canada and Alaska. For the Russians, the base closest New York is Franz-Joseph Land or, on the continent, Cape Tchelionskine. All routes that require the least fuel consumption pass over the polar regions. As Spaatz again states: "A trans-Arctic aerial war is entirely possible now and even probable in the case of future international conflicts."

Conclusion

The world's air strategy, therefore, in the present period is characterized by the progressive replacement of planes with reciprocating engines by jet planes; and the growing importance of air bases and great interest in the Arctic areas. It will be characterized at a later period by the replacement of aircraft with self-propelled projectiles remotely controlled and directed, and a complete transformation of

the problem with bases gradually losing their importance.

Victory will go to the side which possesses the most formidable weapons, from the technical standpoint, and which takes advantage of surprise. There is, however, the possibility of long guerrilla action and the use of standard aviation for the resistance organization.

Whatever may be the nature of the defenses that may be used against self-propelled projectiles, we may conclude that air power will become more and more the decisive factor in the wars of tomorrow.

New Light on German Invasion Plans

Digested by the MILITARY REVIEW from an article by Cyril Falls in "The Illustrated London News" (Great Britain) 30 November 1946.

THE Prime Minister's recent revelation of the reasons for the "Invasion Imminent" signal having issued on 7 September 1940, and the details which he gave about the German invasion projects were received with great interest. Many people knew that this signal had been sent out. Still greater numbers had heard the ringing of church bells, or had been told on unimpeachable authority that they had been rung. The story of the washing-up of bodies of German soldiers, in some cases said to be charred from burning with petrol, was widely circulated and, as can be imagined, lost nothing in the telling.

It was pretty clear that something interesting and important had happened, but exactly what, was left to the imagination or rumor. Curiously enough, only the day before the Prime Minister's statement was made, a famous French scholar visiting the country asked me whether it was a fact that the Germans had attempted an invasion of this country in September 1940 and, when I replied that it was not, remarked that there was a firm belief on the French coast that the enemy had launched an invasion. We now know from Mr. Atlee's statement that the French were not so far wrong, since German troops had embarked on their barges and some of these had put to sea.

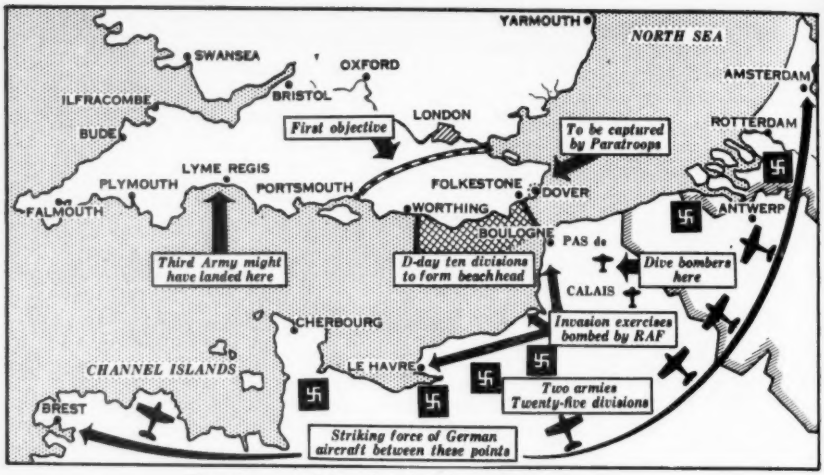
The Prime Minister gave the reasons for the issue of the signal as, first, the movement of barges and small ships to ports between Ostend and Le Havre, which, owing to the risk of bombing attack in these ports, was not likely to have been carried out long before the date appointed for invasion; second, the increase in long-range bomber squadrons and short-range dive-bomber squadrons at points suitable for the support of an invasion; third, the capture of spies who admitted that their mission was to report the movement of British reserves in the area: Oxford—Ipswich—London—Reading; and fourth, the favorable conditions of the moon and tides between 8 and 10 September for landings on the southeast coast. These circumstances, combined with the nature of the air attacks directed against airfields and aircraft factories, induced the Chiefs of Staff to believe that invasion was imminent and that the defense forces should stand by at immediate notice.

All this provided an adequate explanation of what occurred on the British side which will satisfy the curiosity hither-

to felt on this subject. From the historical point of view, however, the other section of the Prime Minister's statement is of much greater importance. In this, he gave an outline of the German plans as revealed by captured documents and interrogations. This, it will be recalled, is not the first information on the subject to be published. Just over two years ago, in fact, some details were issued about a collection of maps and plans captured in Brussels. It was then stated that the main landing was to have taken place in Kent and Sussex. It was to have turned the line of the South Downs and drawn in the British Field Army. Then it appeared, a second invasion was to have been carried out in the region of Lyme Bay, from which armored forces were to have been launched down the valley between the White Horse Hills and the Cotswolds, coming down upon London from the northwest at a time when, it was hoped by the Germans, the main British forces would be facing southward on the North Downs, trying to hold the German Armies which had landed in Kent and Sussex. The plan, as revealed by the Prime Minister, is not unlike the foregoing, but the emphasis is different. Here the Kent and Sussex landing is envisaged as probably the sole operation, and the landing in Lyme Bay as a mere possibility, to be carried out if necessary. The explanation may be either that the scheme divulged two years ago was an earlier project or that the interpretation of the correspondents who were shown the papers was less accurate than that which has been reached since.

The situation outlined by Mr. Atlee is as follows. That summer, Hitler had outrun his immediate plans and found himself unready to exploit unexpectedly great success. He hoped that Britain would accept a peace by compromise, but he also directed that plans for an invasion should be prepared. He demanded that they should be ready by mid-August. The General Staff—which then had at its head Halder, a man of conspicuous ability—did not care for the task allotted to it. There were no special craft. The troops were untrained in assault landings—of which, in fact, the Germans have had less experience than most of the great military powers in history. While all depended on the power of the naval and air forces to cover the landing, the naval authorities doubted the ability of their service to hold off British naval intervention, and considered that the *Luftwaffe* ought to accept the double task of destroying the RAF and preventing interference by the Royal Navy. Though the *Luftwaffe* was prepared to take on this responsibility and the High Command of the Wehrmacht (Keitel and Jodl) would bank on its doing so, the Naval High Command doubted whether, even if it succeeded in the first half of the program, it would be able to carry out the second. It is, however, considered that if it had defeated the RAF, the invasion would have been launched.

The air offensive against the RAF was to begin on 13 August, the invasion itself beginning on or about 15 September; But the decision as to whether the invasion should actually be launched was to be deferred until the success of the first phase could be estimated, and it could be determined with more certainty how far it would be possible to protect the forces of invasion and hold off attacks by the British Navy. As for the landing operations, ten divisions were to be landed in the first four days to form the initial bridgehead. The whole invasion force was to consist of two armies, numbering twenty-five divisions, landing between Folkestone and Worthing. About eight days later, an advance was to be carried out in a line from the Thames Estuary along the Surrey Hills and North Downs to Portsmouth. The future course



The German Plan for the Invasion of Britain.

of the campaign was to depend upon circumstances, and, as already stated, a third army might possibly be landed in Lyme Bay.

Hitler hesitated about "Operation Sealion," as it was labeled. On 27 August, he issued orders to prepare for embarkation. On 3 September the date was fixed as the 21st, with the proviso that the operation might be cancelled twenty-four hours before zero hour. On the 17th Hitler ordered a postponement, and on the 19th he ordered the dispersion of the concentrated craft. On 12 October he postponed the operation until the spring of 1941. In July of that year he postponed it until 1942, by which time he assumed that the Russian campaign would be completed." And that was the end of the scheme.

The obvious reason for the abandonment of the invasion in 1940 was the defeat of the *Luftwaffe* by the RAF, and the consequent failure to achieve the conditions considered necessary as a prelude to invasion. As one of the leading German soldiers remarked at the time of the capture, "the invasion was called off by the *Luftwaffe*." Further reflection upon the condition of the German Navy, which was then in a perilous state, owing to the losses during and since the Norwegian campaign, may have been a contributory factor in the decision. As long as wars are discussed, there is always likely to be debate upon the subject of this abortive invasion in which the only barges that put to sea are believed to have done so to escape British bombing. It has been asked, and will continue to be, whether in the first place the Germans could have brought off the invasion successfully if they had "chanced their arm" and launched it even without securing the defeat of the RAF. Those—I think relatively few—who hold that this was possible, argue that the *Luftwaffe* was still fully capable of keeping all the available force of the RAF occupied, and that it would not have been an insuperable task to keep off the relatively weak and ill-equipped bomber force which we then possessed. But this argument cuts both ways; the *Luftwaffe's*

bombers, though more numerous, might equally have found it beyond their power to prevent the intervention of the British Navy. My own view is that invasion in such circumstances would have failed and that the Germans were right in not attempting it.

The subject of discussion next is whether, supposing that the *Luftwaffe* had won its victory over the RAF—and the margin of the German defeat was not a very wide one—the invasion would even then have succeeded. Here, those who believe that it would have failed base their contentions upon the serious inadequacy of the landing craft. These barges could not face even a moderately high sea, and certainly could not be brought on to an open beach in one. They were extremely vulnerable to fire, much more so than modern landing craft. Finally, they were ill-adapted, even when converted, to the landing of tanks and other heavy equipment upon beaches or anywhere except alongside a quay provided with adequate tackle. Again, it was impossible for the Germans, in the time available, to have made sufficient preparation for supporting fire and the methodical destruction of obstacles. These may have been less important than those which we had to face in Normandy; nevertheless, the landing places with good communications inland—essential element—occur only at intervals along the stretch of coast selected by the enemy, and a good deal had been accomplished by mid-September to make these at least difficult. It is also contended that the Admiralty was too much inclined to think in terms of the Battle of the Atlantic and its demands, whereas no success gained in that battle would be of any value if the Germans succeeded in their invasion.

Here I am disposed to the view that, with reasonable good fortune in the weather on their side, the Germans would probably have succeeded in establishing their bridgehead. Build-up and maintenance during the next ten days is a far more difficult question to debate, just as it would have been a more difficult task to carry out. Yet it seems probable that here also the enemy would have had a fair prospect of success. As to the operations of the land forces, supposing twenty-five divisions to have been landed, even with a loss of 50,000 men or more, I do not consider that there could have remained any doubt of the outcome if their supplies were maintained. The disparity in armament was overwhelming; the disparity in the numbers of organized formations was considerable. We should have put up a stout fight, and our armies would have had a great leader in the Commander in Chief, Home Forces, but the odds would have been too great. It must be noted, however, that in my appreciation I have given the Germans every possible advantage before I have brought them to this final stage, which they might not have reached. It remains the fact that, however we look at the circumstances, we escaped in those September days of 1940 the most terrible danger which ever overhung our country. The words of Mr. Churchill about the debt of the many to the few represent the truth still, and are unaffected by the information now disclosed.

Ideas on Total War

Translated and digested by the MILITARY REVIEW from an article by General Carlos Iribar in "Orientación" (Uruguay) September 1946.

THE concept of total war is not new. Far from it. It started with man's struggle for individual existence. The problem was to live or die.

We can admit that total methods of war reached their maximum use in the Thirty Years War in the eighteenth century, without forgetting Attila, King of the Huns in the fifth century; Genghis Khan, the bloody Mongol conqueror in the thirteenth century; the Swedish general, Forstensson; and the destruction of the Palatinate by Turena.

It has been claimed that the Napoleonic campaigns, without reaching the form of a total war, characterized a return to unnecessary violence. Personally, I don't believe so. However, there is no doubt that the Germans were the first, under the direction of Bismarck and Moltke, to study and apply the system of the Napoleonic wars. In the campaigns against Denmark, Austria, and France in 1870, they returned to unjustifiable methods of violence. According to a majority of the most generally accepted military critics, this return to unnecessary violence was more due to the influence of Von Clausewitz than of Napoleon. Undoubtedly, Clausewitz was a philosopher, possibly the greatest military philosopher in history. But he was a Prussian and therefore unable to free his mentality from the influence of Prussian militarism.

But should we attribute to Clausewitz' influence exclusively this integral return to the methods of total war? No. Ludendorff says that Clausewitz' writings are not only obsolete, but that at present its reading can lead us only to confusion and error. What are the causes, then, that have lead to total war? Should we attribute them exclusively to Hitler's Machiavelian spirit and to the doctrine of destruction that has characterized the German General Staff since the time of Clausewitz? Yes, but there are other reasons that have completely modified the classical concept of war, giving rise to new philosophical concept.

In Clausewitz' time, the armed forces had absolute freedom. In them lay the only power a nation had that was applicable to war. The outcome of a campaign was exclusively decided by the encounter of these forces. The rear was of little or no value, except for providing the necessary spaces for strategic maneuvers and for lines of communications, which were more necessary to insure a retreat in case of defeat, than for actually supplying the forces in combat. At that time, the financing of war was undertaken by the public treasury, backed up by a few special taxes. The truth is that the genius of the strategist dominated everything. The glory of a military victory was an exclusive privilege of the soldier; while the majority of the people ignored the existence of the war or spoke about victories and generals as something quite remote.

From this era on, the ideas of the French Revolution spread all over Europe. Under this influence, European armies grew in numbers and in quality of the materials used as a result of the evolution of industry. With this development, armies started losing their independence and became more and more dependent on the rear areas. The need of armies to live and fight increased, and this reached such a development that they could be supplied only from the rear, through the effort of the civilian population.

From here on, the strategist loses his independence; spaces are limited, time be-

comes increasingly import in view of the fact that it is dependent on the rear. His conceptions, to a certain degree, start being subordinated to the capabilities of the national effort.

Thus, the beginning of the era of systematic organization of the rear and a new strategist, the politician, makes his appearance. He makes plans and maneuvers with finances, with industries, and with the efforts of the whole mass of citizens and then it is not only the armies, but the whole population that has to face the horrible problem of war.

From here springs the famous theory of "a nation in arms" and the concept that the spirit of the army must be a prolongation of the national spirit and that wars that do not have popular backing are doomed to failure.

We also have a second great principle: "that the morale of the armed forces depends on the morale of the laborers working in industry, the same way that the defeat of an army on the field of battle, ends up by creating panic in the rear areas."

From the above, we can admit that the forces that a nation dedicates to its defense are integrated by the sum total of the physical, economic, moral, and intellectual power of its population, and its magnitude is the result of its laboring power, of its spirit of sacrifice, and of its will to win. And this is why it is called total war.

Nevertheless, I must point out that it would be dangerous and incorrect to reach the conclusion that the military forces here lost importance beside the immense and complex conglomeration of activities that represent the organized forces of a nation. On the contrary, at present, just as in the past, the outcome of war, and consequently the future of a nation is decided in the last and absolute instance on the field of battle.

If the forces of a nation are the sum total of its physical psychic elements applied to the only and fundamental objective, the national defense, it is logical to admit that its defeat could be possible only through the total destruction of all of its forces, military, political, social, economic, industrial and moral. That is to say, the field of battle reaches the whole territory and all human activities of a nation. This is the political strategy designed to win the interim battle of a nation, the sources from which a country obtains its life.

Hitler called this "broadened strategy," boasting of having created a new theory in "the art of war." What were the means employed by this new strategy? Fundamentally, they were permanent mobilization and coordination of all resources of a nation preparing to wage war against another country, systematic employment of all material and psychological means which science has devised, and the unification of all power under one direction to guide all military and political activities.

It was broadened by a war of nerves and propaganda, psychological weapons that followed a policy inspired and intended to wage war. War, therefore, although under other forms, was conducted even in time of peace for it identified itself with the very existence of a nation.

The French Army of the Transition Period

Translated and digested by the MILITARY REVIEW from a French article by General de Lattre in "La Revue Hommes et Mondes" (France) November 1946.

THE change from war to peace gives rise to delicate problems. The reduction of the size of the army, the adaptation of its missions to new international conditions resulting from the conflict, the application of the lessons learned, and the new means that have been born of the war impose a transition which continues, usually, several years. In addition to all these factors there are others which make the rapid reconstruction of our military system difficult.

In her desire to resume her place in the Allied coalition, France has seized all opportunities for the reconstitution of her forces. It was unavoidable that at the hour of victory, these forces should present a heterogeneous character. Due to their origan, organization, and armament, they reflected the successive phases of a development born of necessity, and not of a preconceived plan. Although a will to conquer and a patriotic inspiration created considerable unity, each force possessed characteristics that differed considerably.

Moreover, the world-wide disturbance was of such magnitude that eighteen months have not sufficed for clarifying the main features of the new international order. The organization of collective security remains yet to be decided on. Frontiers have neither been drawn, nor are the forms of government of conquered countries known as yet, particularly that of Germany. As a result, we must continue to plan our national defense.

Lastly, it was only at the very end of the war that the results of the scientific research which were stimulated by it were manifested in the most revolutionary manner. In the past, new weapons had been employed before the end of the conflict; they did not hasten the end of the war until after a lapse of time sufficient to learn the lessons presented by their employment. In 1945, however, the lightning that fell at Hiroshima, in bringing about the cessation of hostilities, completed an era, and rendered valueless, in an instant, the greater part of the lessons one would have been tempted, up to that time, to draw from five years of fighting.

We see, therefore, that the contribution of the past is meager: France has received from it few material assets and the family of nations has received but little clarity as to the future.

This forced abandonment of historical methods has at least the advantage of forestalling mental laziness. It prevents us from committing the error that is only too well known, of preparing to fight the war of tomorrow with the weapons of yesterday. But for all this, the conjectural method that we are now inclined to resort to, is full of risks that can only be reduced through deep and constantly renewed study. Such study cannot be haphazard nor ever regarded as complete. Its conclusions can neither be applied immediately nor can they ever be considered final.

As long as the study phase lasts, therefore, we must have a transition period army. And when this phase shall have progressed sufficiently to authorize major conclusions, we will need an army that is in a state of ceaseless evolution. The dogmatic type of intellect which is content with formal regulations and semi-fixed organizations must give way to the flexible type of mentality which is always ready to adapt itself to new formulae both with respect to conceptions of war and their execution.

These general considerations are not the only ones to be considered. Our pres-

ent financial situation intervenes imperatively. In principle, the wisdom of credit reductions cannot be argued, for, in the final analysis, it is not alone a matter of reducing our budget load with respect to our financial equilibrium. It is essentially a matter of regaining prosperity, which is the creator of material power and social equilibrium. These are two factors that are essential in national defense.

Nevertheless, this rigorous reduction results in grave repercussions, because it necessitates reduction of personnel and limitation of matériel, not in accordance with a previous analysis of requirements. Therefore, however great may be our desire to carry out a systematic program of reform and to adopt modern means of combat, this desire is dominated by the obligation to give priority to the immediate needs of our army.

Our army tasks are heavy. In all the territories of the French Union, the presence of our troops is the necessary symbol of units, the safeguard of independence, the guarantee of the peaceful evolution of native populations. In Indo-China it is the necessary condition for eliminating a state of anarchy provoked by Japanese occupation and propaganda. In Germany it is the sign of our victory and one of the guarantees of our future security. It is obvious that France must maintain sufficient forces to remain the controlling and energizing agent of these efforts. In addition, she has a permanent and important mission of her own to fulfill, which is the military training of the nation. The various tasks that have just been enumerated must be accomplished by enlistment, to a lesser extent. In order to keep and accentuate its national character, to maintain a popular enlistment and the training of reserves, our army is forced to keep a number of units on the soil of France, which are large enough to permit incorporation in them of the larger part of the annual reserve classes.

The Present Stage

Last March (1946) the Government submitted to the Constituent National Assembly a series of bills relative to the general organization, officers, noncommissioned officers, men and recruiting of our armies.

In spite of its willingness, which it expressed on many occasions, the Assembly was unable, owing to considerations of a material nature, to take up the examination of these measures. The second assembly, also, was obliged to conclude its labors without expressing itself with regard to them.

This involuntary delay may have avoided premature legislation, but it also blocked all deep-rooted reforms. Parliament alone is qualified to make decisions in the matter, and, as a result, the changes that have been made up to the present time, are less organic than dynamic in their nature.

Nevertheless, by means of the "law of finances and collectiveness," the Assembly made possible numerous necessary modifications in the old state. Bitter fruit of necessity though it was, especially when it affected the status of individuals, it had the merit of contributing to the elimination of routines, to the revision of archaic or superfluous institutions, and to the retention of what was vital.

The effort was particularly directed at the competency of the Ministry of Armies, of the Committee of National Defense, and of the Command. That is why its effects were particularly noticeable in the training of cadres and men.

In this respect, the failure of the methods in force before 1939 was so evident that it would have been criminal to continue to apply them to young Frenchmen under twenty years of age who had been called to the colors.

Moreover, other countries, especially the great democracies which had been called

on during wartime to create gigantic armies, had perfected methods of instruction whose value was attested to by the victory that was won. Our duty was, therefore, not to imitate servilely these experiences but to seek, in the direction indicated, original solutions which would meet the conditions proper to France and which would conform to our national military spirit.

Without doubt, the war demonstrated the prime importance of technical matériel and training, but it also proved their precariousness. In the scientific uncertainty in which we find ourselves, and in our state of poverty, what matériel presents a durable guarantee of effectiveness, what methods will be effective tomorrow? In reality, the greater the discoveries of science, the more the permanence of certain constants is emphasized. Training which aims at obtaining more than immediate results should therefore give particular stress to these constants.

The most essential of these constants is man himself who will remain the "first weapon in war." Therefore, the mission of the army is the training of the man as a fighter. Such training cannot be expected from artificial or superficial methods. Their aim is, at one and the same time, to teach a trade or profession and to produce a deep impression on all the various aspects of the personalities of the young men. It is necessary that this training come from an organization which itself possesses character and whose realism approaches as closely as possible that of actual warfare. That is the military reason why it has become indispensable to do away with barracks life during the first six months' "training phase" of military service, and to substitute in its place the "light camp" of the battalion, group or regiment.

We see by these simple statements how erroneous it would be to fear that this system would impart to the army any resemblance to organizations of the "boy scout" type. Such criticism comes from hasty judgment without sufficient information concerning the system and the manner in which it is applied.

Since the soldier goes into battle in the ranks of a platoon, it is in the platoon that he lives and receives his training under the direction of a commander who conducts and shares all his activities and influences them deeply. In this basic unit, our recruits find an exceptional atmosphere of comradeship and emulation. There results from this a healthy youthful atmosphere that is developed by military sports. It would be a grave error to imagine, however, that life in the open is synonymous with a free and easy life or vacation. The law of the camp is the law of effort. Discipline is strict there, but also neither irritatingly extreme nor easy-going. Personal appearance is the object of constant vigilance. As for work, it is intense and often forced to the point where the man is obliged to exceed the usual limits of his ability, thus revealing possibilities he has been unaware he possessed. In this way his character is tempered and his confidence in himself is increased.

Of what does this work consist? Performed with emphasis on dynamism and realism, it does not aim to incite the performance of extraordinary feats, but to teach the performance of the normal operations of war with perfection and ardor.

The first quarter is devoted to inculcating firmly in all men, whatever be their arm or their future specialty, that military training which forms the common foundation of all soldiers: discipline, physical training, close order drill, topography, understanding of and use of terrain by day and by night, etc.

This basic training aims to create firmly established reflexes, to awaken interest, and to stir up the minds of the recruits

in order to awaken their faculty for adapting themselves rapidly to unforeseen situations.

This awakening of military mentality is continued during the second quarter. The task is then to make all our young soldiers into qualified fighters, and a large number of them into noncommissioned officers and specialists. Each man is initiated, in the most concrete possible manner, into an understanding of one or more uses of his weapons and the use of the corresponding matériel, so that he will acquire a "feeling" for the equipment. The aptitudes thus revealed are utilized to prepare the most capable for service in the most difficult specialties. In short, each one is prepared so that at the end of the first six months of service nearly all the tasks called for in the table of organization can be fulfilled. We are able to judge from observation that long before the six months of their training stage is completed recruit units could be used, in case of an emergency.

As a matter of fact the final lessons taught by the recent war and the use of French Forces of the Interior in the ranks of the First French Army showed that young and ardent soldiers were able to fight in the ranks after no more than two months of intensive training, provided they had cadres of battle-tested specialists and noncommissioned officers with them. That is why orders have been given to effect such an amalgamation if necessity should demand it.

The professional military men have been organized in such a way as to provide, in all arms, the indispensable minimum of permanent cadres, and each corps will receive recruits in two unequal contingents six months apart. In this way, each battalion will always possess a minimum of one company of men of longer experience who with the personnel serving beyond the legally required period, will be able to take care of the tasks calling for specialists. Thus, our regiments will be practically usable ten months out of the year, that is to say, permanently except for the two months following the principal incorporation of recruits. Even during these two months, we will have half of our units perfectly trained because the principal incorporation is set for springtime in the half of France north of the Loire, and for autumn in southern France and North Africa.

It is not going too far to say that what our army has done in the course of a few weeks time in the matter of training plans constitutes a veritable revolution. The good will of the young and the ardor of the officers and noncoms have brought success. There no longer exists the danger that military service will be a hiatus in the life of the young Frenchman. It is now, for him, a period of real and attractive activity in which his body is strengthened and his personality enriched. Above all, it insures the country a guarantee of security, the most valuable guarantee that a year of service is able, at present, to furnish.

The Future

Along with this effort, others have been undertaken, efforts which are shaping the beginnings of our future army.

The considerable reduction of our forces, especially in France itself, has, of necessity, entailed a corresponding reduction in the number of our divisions. The dispersion of those which remain over vast territories would have rendered them ineffective.

Moreover, the lessons of our last campaigns stressed the importance of flexibility and mobility. The traditional division proved to be too heavy to be engaged as a large centralized unit and it was often necessary in battle to modify its organization.

The enormous increase in fire power resulting from the employment of new

weapons such as atomic bombs, reaction-propelled projectiles, etc., shows that in the future, dispersion will be forced upon us as an inexorable law, not only on the field of battle but throughout all territory susceptible to bombardment.

These considerations have led to the search for a new type of large unit which will be lighter than the old division, but also powerful. Studies have been undertaken to determine the type of this large unit which, should be capable of being transported by air.

While awaiting the conclusion of these studies a step toward lightening the large units has effectively been taken by dividing the old divisions into independent tactical groups about one-third the size of the division. Naturally, divisional organizations (staffs and elements) are kept permanently intact and ready in the event of a coordinated action by several tactical groups. This reorganization, which presents the advantage of training a large number of young officers, makes no pretense of being the final solution, but it does indicate the trend we are following at the present time.

New developments effect the very foundation of our conception of national defense. Already shaken by the massive intrusion of armor, the linear concept of territorial protection has been definitely condemned by the possibilities of airborne forces. In case of war, it is quite obvious that the battle will not be at the "front" only; it will be everywhere. It is therefore probable that the composition of armed forces must provide for an extremely mobile and powerful combat force capable of carrying the fighting to the enemy or of crushing a large enemy operation at any point in our territory, as well as for strong territorial units which can be easily raised and equipped for stopping foreign invasions or limiting their development.

In order to study certain points in this field, our airborne division is now undergoing reorganization. The largest part of it will continue to be stationed in North Africa, but one group and a parachute school, which will serve as a center for experimentation, will be in France in close contact with the command. It is evident, therefore, that the air force and ground forces will be called on to collaborate thoroughly, but without overlapping of authority, and without any strict separation.

Habits of regular cooperation established by war experiences are being created between the three components of our armed forces. Without any attempt at amalgamation which would have prolonged the time and complicated still more the reforms each component needed, the present ministerial structure has fortunately increased the occasions for contact between staffs.

We are now able, by this closer union, to recognize better the imperial character of our military problems. The great theaters of operation, geographically speaking, have ceased to be autonomous. Our national defense cannot be conceived on any scale but that of the French Union.

This friendly cooperation among ground, sea and air forces is on the verge of making a decisive change in the nature of our higher military education. It has, in fact, been decided by the Committee of National Defense that the *Ecole de Guerre* (War College) shall be, from now on, common to the three components, ground, sea and air forces. Each will continue to have special courses, but all students will receive a common training in the problems of general tactics under centralized direction. In the strategic stage, a College of Advanced Studies of National Defense will not be content with bringing together the best minds of the three components, but will bring them into contact with civil personalities, great functionaries, the directors of commercial insti-

tutions, sociologists, diplomats, etc., whose place is logically indicated in this sort of university concerned with all problems touching our national defense. A great deal is to be expected of these innovations. Thanks to liberal exchanges, to associations, to researches carried on in a spirit of broad-mindedness, they will establish a unity of doctrine that will be productive of unity of action.

A similar method is followed in the more modest plan of training young officers. The division of the army in a certain number of arms is no longer tenable in an era when a tank commander must possess the qualities of a cavalryman and an artilleryman, and at times of the engineer and the foot soldier. Before taking the courses in the service school of their arm, all the future officers receive the same basic instruction in an inter-arm school.

In preceding paragraphs, we mentioned the obvious importance of equipment. In indicating the rate at which new inventions and discoveries made their appearance, it was not only our intention to emphasize the value of constants, but also to indicate the importance of scientific research. A nation that is outdone in this field is beaten in advance on the field of battle.

It is undeniable that France must catch up the considerable distance she has fallen behind, a distance which is still increasing. She is capable of doing this, thanks to the ability of her scientists, on condition that they are supplied with sufficient appropriations and adequate installations. This is a matter of interest to the entire nation, and especially to the army, because the latter has priority in matters dealing with the country's economic power and those discoveries of military application. Although the present organization does not confer direct responsibilities on the command in this matter, the latter cannot remain aloof to atomic, biological, electromagnetic, ballistic, and chemical research, the results of which condition all profound changes in armies and the determination of their future forms.

It is, therefore, highly desirable that the army budget should make reasonable credits available for research and that a scientific council should look after their distribution and supervise their employment with the assistance of a technical staff. Excessive close-fistedness in this matter means "eating the grain reserved for sowing."

In a general way the infinitely complex problem with which we are faced in the general reorganization of the army, both in its doctrines and employment and its structure and administration, are at present the object of systematic and deep study by the "Committee for the Reorganization of the Ground Forces." Nothing warrants our making any premature statements regarding the conclusions that will be reached. But when Parliament takes up the matter it will have at its disposal many well trained elements with which to define the French conception of the war of the future.

Although the strength has been greatly reduced since the beginning of 1946, and its matériel is limited, the ground army still retains a considerable force. The French Army is engaged in Indo-China and it is occupying Germany. More than six divisions are employed in these two armies. The reorganization that is in progress is going to give us in France and in North Africa, as soon as the next contingent is incorporated, a second echelon of comparable, if not superior forces.

Thus, in the immense task imposed on France in the reconstruction of her forces, the army is not the least active. In spite of exceptionally unfavorable circumstances, the army has set itself to the task. As in the case of foreign armies (which victory has, however, found at

their peak) the French Army encounters formidable uncertainties, but it does not use them as an excuse for passivity. Reduced much more than other armies to a state of great poverty, the army refuses to lose faith in itself. The source of this is its fidelity to the glorious memories of the past, pride in the part it played in victory and the consciousness of its constant obligation to the nation.

Jeep Railway in Burma

Digested by the MILITARY REVIEW from an article by Lieutenant Colonel P. A. Easton in "The Royal Engineers Journal" (Great Britain) December 1946.

IN July, 1944, the 36th Division landed on the airfield of Myitkyina with the task of advancing via Mogaung down the railway towards Mandalay. This phase was completed early in December by the capture of Katha, where a spur of the railways rejoins the Irrawaddy. During the whole of the advance down this "railway corridor," roads were either nonexistent or, at best unpaved cart-tracks of very limited capacity. The division was therefore on air-supply (from Ledo) throughout; but in order to economize in airlift as much as possible, it was decided to use the railway as a ground line of communication. This article gives a brief account of the engineer work involved in opening and operating the line.

Opening the Line

The 150 miles of single track meter-gauge railway between Myitkyina and Katha had suffered considerable mutilation at the hands of the RAF and the retreating Japs. Most bridges of over 40-foot span had been demolished (often with trucks cast into the gap), craters were frequent, points were usually either missing or blown, and long stretches of line had been removed into hiding or used elsewhere.

This was bad enough, but to make things yet more difficult, no large items of equipment could be flown in for the work, and existing material had to be used throughout. Missing rails and points were supplied from stocks captured from the Japs, or by demolishing unwanted sidings and spurs; bridging was in framed timber trestle construction; stringers were improvised variously from 60-pound rail (five per girder), out of an old sugar factory, girders from a demolished road bridge, and finally balks of local teak. The line was made single track, with passing places from five to seven miles apart. In all, some twenty-eight bridges were built, with spans ranging from 20 feet to over 200 feet, numerous craters were bridged with timber cribs, and ten miles of track relaid from scratch. Finally, turntables for jeep locomotives were improvised, telephone cables connected, and the line was opened, normally only ten days behind the forward brigades. The whole railway was open to Katha, by the middle of December.

Rolling Stock and Locomotives

Sufficient rolling stock was captured, in working order to carry the supplies required. All stock was carefully overhauled before use and faulty cars pushed off the line. Box cars and flats were both

employed and a passenger coach taken over for the use of the general.

Locomotives, however, were not so easily obtained—none were captured that were serviceable or repairable—and once again improvisation was required. One form of locomotive consisted of a box car with a lorry engine connected by chain drive to one of the axles. This did function, but a more economical, reliable and useful kind of railway engine was found in the converted jeep. Owing to the large number of these that were used, the whole project came to be known as the "Jeep Railway."

Basically, the transformation from jeep to locomotive consists in the substitution of suitable rail wheels on to the existing axles. The jeep was then coupled to a train, comprised usually of two 10-ton box cars. A timber sleeper was fastened as buffer over the bumpers back and front, and the jeep securely attached to the front car by a chain and shackle, any slackness being liable to cause bumping and danger to the rear of the jeep.

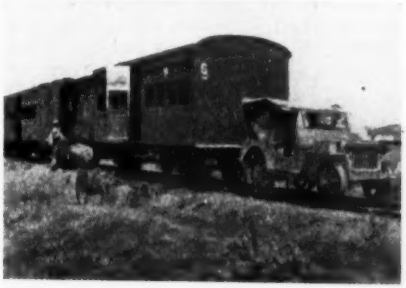
Jeep trains are not easy things to drive. Starting is done by engaging low gear (four wheel drive), opening the throttle and letting in the clutch with a bang.

The wheels spin, but the train moves off slowly (unless the load is too great, in which case another jeep or some men are required to push), and the engine speed can be reduced until the wheels stop spinning. This method preserves the clutch plates and does not damage the wheels. It is fatal to slip the clutch.

Gear changing is carried out normally, but stopping is again a skilled business. The jeep brakes are totally ineffective, and trains have to be rolled to a standstill on engine compression, starting about 500 yards or so from the halting place.

By these methods, satisfactory running was achieved. A speed limit was imposed of twenty-five miles per hour on the jeep speedometer (in reality about fifteen miles per hour due to the reduction of wheel diameter). The trains could negotiate inclines of up to 1 in 100, and would average from eight to ten miles an hour over moderately hilly sections. Light rain or mist caused wheel spin and so restricted early starting, but heavy rain had little effect and no substantial delays were caused for that reason.

Jeeps needed frequent overhauling. Excessive vibration tended to loosen the nuts and bolts in wheels and chassis, steering



Jeep Railway in Burma.

would slacken, oil seals leak and wheels rapidly became elliptical. By prompt attention to these failings, a high proportion of jeeps were kept in working order.

Organization

The running of the railway was controlled by the engineers of the 36th Division. This proved the most satisfactory arrangement, first because running was so closely connected with repair of the road, second because the engineers could then coordinate the normal railway service with trains carrying engineer stores for the work. The division engineer appointed as his executive a "Divisional Traffic Manager," and this officer was responsible for attending conferences, arranging train time tables, liaison with

sapper parties on the line and administering railway personnel.

Station staffs consisted of a transportation officer with an assistant and a switchman. They were responsible for marshalling trains and checking loads (with inexperienced drivers only half loads were allowed) and were in communication by phone up and down the line. The transportation officer in his own area was all powerful and had to be a man of personality—being required to cooperate with several nationalities.

Driving a jeep train is tiring work, and a tired driver may cause an accident through no fault of his own. Accordingly two drivers were provided per train to work in shifts, and close attention had to be paid to their food, sleep and welfare during the advance. Night driving (unless lights could be used) was avoided whenever possible. In doubtful country, a railway patrol was sent out with the first train of the day to cope with possible ambushes, and two guards accompanied each subsequent train if Japs were suspected in the area.

An emergency repair party of sappers was held ready to deal with derailments and hasty repairs to the line. At railhead there was an engineer detachment for servicing and repairing locomotives, who gave invaluable assistance throughout.

Performance

The largest lift in one day was 230 tons over a twenty mile stretch of line. The greatest number of trains on such a stretch at one time was eight; four in each direction, with possibly one or two double trains among them. No figures are available for the total tonnage lifted, but the line stayed in operation for five months. By mid-December the Americans had steam locomotives on the line, and the project was turned over to them.

The Canadian Arsenal

Translated and digested by the MILITARY REVIEW from a French article by J. Augustin Leger in "Revue de Défense Nationale" (France) October and November 1946.

OF all the free peoples of the British Commonwealth, it was Canada that made the most substantial contribution to the cause of the Allies and the rescue of Great Britain.

An official publication of the Canadian Federal Government for 1943-1944 brings out the fact that while World War I was settled for by the Dominion by an outlay of a little over three billion dollars distributed over the fiscal years of 1915 to 1943, World War II has already cost her close to six billion dollars for the fiscal years of 1940 to 1943 alone. With hostilities at an end, she would still have to meet the costs of demobilization, return of discharged men to civilian life, and pensions.

Turning our attention to the human side of the matter, more than 500,000 men had been called to the colors by September 1942, 750,000 by May 1944, as well as more than 30,000 women. Out of a total population which amounted to but little more than 11,500,000 in 1941, more than five million were engaged in some activity useful to the defense of the nation. This was over fifty-seven per cent of all personnel over fourteen years of age.

As to combat activity, the two corps of the Canadian Army comprised three

divisions of infantry, two armored divisions, two armored brigades, auxiliary troops and engineers. With 600 vessels in 1944, as compared with fifteen in 1939, the Navy totaled 70,000 men as compared with 1,774 in 1939. Aviation grew from 4,500 to 200,000 men plus a division of women numbering 1,500. Thirty-eight squadrons were in operation by the end of 1943.

After waiting three years in the training camps of the United Kingdom with nothing but participation in the attack on Dieppe in August 1942, the contingents destined for the continent were organized in November, 1943, into a corps whose 1st Division, attached to the British Eighth Army, fulfilled difficult missions in the conquest of Sicily and southern Italy, the advance on Rome, and the battle of the Garigliano. During this time, their brothers were aiding the Americans in the occupation of Kiska and the Aleutian Islands.

In April and May 1944, the Royal Canadian Air Force played a leading part alongside the Royal Air Force in the aerial bombing which preceded the attack of "Fortress Europe." On 6 June, naval, air, and ground forces cooperated in the Normandy landing, afterwards crossing France and helping to break the German resistance.

But it is not the military point of view that we propose to deal with here. Rather, it is the prodigious economic effort made by Canada to provide the fighting forces with all forms of armament. This effort placed her fourth on the list of the United Nations, as stated by her minister of munitions: "Canada was surpassed, in quantity, naturally, by the United States, Russia and the United Kingdom. But, by the speed, variety, and quality of her production she contributed powerfully to changing the rather precarious, defensive situation of the Allies into victorious offensive . . ."

At first, Canada believed that she would have nothing but her own forces to equip, and a few small British orders to fill. For Canada, the war had not broken out unexpectedly. Even on the North American continent its approach had been felt since the time of that speech in Chicago in which President Roosevelt had sounded the alarm, a speech for which Nazi Germany never forgave him. In 1937-1938, came contracts for the manufacture of Bren machine guns. Towards the end of 1937, the Canadian Ministry of National Defense took measures for the construction of an installation for experimentation with different types of projectiles. In November 1938, the British Air Ministry ordered forty Hampden bombers and forty Hurricanes. At the beginning of August 1939, it was 100 guns with carriages and 200 separate carriages from another firm. In the face of imminent war in the summer of 1939, however, the Government decided to take immediate measures to organize for the production of war material. It established a Purchasing Commission which became the War Supply Commission and later was incorporated into the Ministry of Munitions.

With the fall of France, conditions changed completely. Obliged to replace all the modern matériel that she had lost, and prey to the massed bombings of the *Luftwaffe*, Great Britain delegated to Canada the task of manfacturing all those things that she herself was no longer sure of being able to produce.

To produce the long list enumerated in cablegrams from London, Canada immediately organized to the full limit of her capabilities. In July, after an interval of joint study with the United States, it was decided that the arms asked for should be manufactured by the country that could meet the requirements in the shortest time possible. The United States assumed part of the program rather than

make it necessary for Canada to make too extreme an effort. Thus, began the fusion of the efforts of the three nations through a bureau opened in Washington in March 1940. In April 1941, President Roosevelt and Prime Minister Mackenzie King, concluded the Hyde Park agreement which gave Canadian purchasers the same privileges as American purchasers.

The situation was far from being bettered by the German attack on Russia in 1941. At first it was feared that, after a rapid victory, the enemy would turn, with all his forces, against the British Isles. The Soviets, moreover, now required supplies. Thus arose the necessity, during the summer of 1941, for more rapid and intense production than during the preceding year. Hundreds of new plants sprang up.

The Japanese attack in December 1941, brought the United States into the struggle. America now had to reserve for itself the raw materials and machines which previously had largely been made available to its neighbors. The order of priorities would at least be reversed. The United States was in turn to call for assistance. The day after Pearl Harbor it dispatched planes to Canada to bring back machine guns manufactured in Canadian factories and which were vital to U.S. defense.

In 1940, Canada had worked out her plans of organization and development. In 1941, she had built factories and had begun to produce. Now in 1942, a multiplicity of new tasks were imposed on her. She found herself obliged to produce nearly all types of ammunition and war matériel. There followed a period of phenomenal industrial expansion which reached its peak in 1943 with a level of production so high that, thanks to the mutual aid plan, it had been possible for her to increase her export to Russia and China, in addition to those to Great Britain, South Africa, Australia, New Zealand and India.

To meet this demand, Canada already possessed an abundance of means. All that was required was development and action. Some industry, however, had to be created from the ground up. A most striking example is, perhaps, that of the metallurgical industry.

As soon as war was declared, the British government had become a purchaser at current prices of all the copper, lead and zinc available. Mines already producing were obliged to increase their output and others made ready for production. As for the rarer metals, the necessity arose for discovering and producing them. This was the case with antimony, chromium and cobalt. Deposits of molybdenum, formerly imported from the United States, were found and mined. The same was true of tungsten and mercury. Magnesium, obtained from dolomite by an original process, answered all the essential demands. As for nickel, Canada produced ninety-four per cent of its needs, the balance coming mainly from New Caledonia. A greater triumph still was the development of the aluminum industry, whose production in 1944 almost equalled that of the entire world in 1937.

Although iron ore is fairly abundantly distributed over Canada, production from 1923 to 1939 was negligible. In 1939, subsidy by the government permitted the start of operations at the "Helen" mine in Ontario, which produces annually from 450,000 to 470,000 tons. At Steep Rock Lake, the existence of another vein had been known for a long time. Its development required the drying up of the lake to uncover fifty million tons of ore, twenty million tons of which are believed to contain sixty per cent iron. Annual production reached two million tons. In addition to these two deposits, and another in New Brunswick, Canada had recourse to importations from the United States

and Newfoundland—the latter exposed to the attacks of submarines in the Saint Lawrence Bay.

To treat this ore, five supplementary blast furnaces were erected, one of 1,000 tons capacity daily, at Sault-Sainte-Marie; one of 850 tons at Hamilton; while another of 550 tons was moved from Ontario to Sydney, Nova Scotia. Rolling and finishing also required reinforcement.

The manufacture of steel for guns or armor is a delicate operation to which the Canadian technicians were not accustomed. But they were not content with the experience of other countries. They conducted their own research and made improvements. The Steel Administration, established in June 1940, distributed materials and labor and coordinated activities.

Her iron industry had been Canada's weak point. World War I caused additional progress to be made, but in spite of this, iron and steel works still occupied but eleventh place among the twenty-five principal industries in 1925. They advanced to sixth place by 1941. The output in 1943 was expected to be more than three million tons out of a total capacity of 3,400,000—nearly double the pre-war capacity.

The machines for working metals represented scarcely a third of what was necessary. The aid of the United States was solicited, and also that of Canadian industry, whose contribution, calculated at four million dollars in 1939, rose to twenty-two million by 1943.

Coal consumption was 28,500,000 short tons for the year of 1 April 1939 to 31 March 1940; 41,500,000 in 1941-1942; and 44,400,000 in 1942-1943. There were three principal deposits: Nova Scotia and New Brunswick in the east, British Columbia in the west, and in the center, Saskatchewan and Alberta. Ontario and Quebec, although by far the most industrialized of the Dominion, found it more advantageous to obtain their coal supplies from the United States or Great Britain. In May 1943, the Coal Administration had all former miners brought back to the mines.

As for oil, Canada was classed as tenth among producing nations with 8,000,000 barrels in 1939. Of all the countries of the British Empire, Trinidad only exceeded her. Her wells did not suffice, however, for more than fifteen per cent of her own needs, she being, after the United States, the nation which consumes the most per capita. Her needs had been tripled even before the opening of the second front, due to the mechanization of war.

In 1943, thirty-six oil refineries were operating in Canada, eleven of them in the eastern provinces, three in British Columbia, and twenty-two in the prairie provinces. These were capable of meeting the civil and military demands as well as those of Newfoundland. More than 48,000,000 barrels of fuel oil were produced in 1942 with only 3,350,000 barrels imported.

On declaration of war, Canada had had to undertake the manufacture of tires for military use, for which she was hardly prepared. Once cut off from sources of rubber in the Dutch East Indies and Malay she was forced to economize. The Rubber Administration took all measures for rationing for civil uses and for salvaging. As the stocks for raw rubber diminished, the necessity became more and more apparent for finding a substitute. A plant was constructed during 1942 at a cost of $48,000,000 at Sarina, from which an annual production of 34,000 tons of buna and 4,000 tons of butyl was expected. This, added to the small quantities of neoprene obtained from the United States, and reclaimed rubber, was expected to suffice for Canada's war requirements.

A no less vigorous effort was made in the field of chemical products and explo-

sives, for some of which the Canadians discovered new methods and applications or modes of employment. Production reached 10,000 tons per week. The Chemical Products Administration looked after more than three hundred products. It took charge of the Canadian distilleries where enough alcohol was produced from wheat to cover all industrial needs and to permit large exportations to the war industries of the United States.

Canada's timber products output after September 1939, was the greatest in her history. Though she retained half of this for her own use, she exported a fourth to the United States, a sixth to Great Britain, and the remainder to the United Nations, which supplied, in 1944, seventy per cent of the British needs which formerly came from the Baltic countries.

During World War I, nothing but orders for rifles and shells had been given to Canada. Sh continued, this time, to manufacture small arms, but on a very much greater scale. The cost of the modified Lee-Enfield rifle of the British army was reduced by half ($32.00 from $62.00). The Long Branch works, a modern, high output factory employing nearly 5,000 persons, sixty per cent of whom were women, manufactured nearly sixty rifles an hour by the beginning of 1944. It also manufactured the Sten machine carbine, favorite weapon of the paratroops, commandos, and resistance movements—75,000 by the end of 1943, with a maximum of 8,500 per month.

The Bren machine carbine, whose cost it was possible to reduce from $230 to $160, was manufactured in a factory which was regarded as the largest in the British Empire. The Government had invested in it more than twenty-five million dollars. By the end of 1943, more than 125,000 Brens had been produced. A special caliber was developed for China. The Browning 9-mm automatic pistol, replacement barrels, Browning aviation machine guns, and Boys rifles were other specialties of the same factory.

The contribution demanded of Canada was not, however, to be limited to this field alone. In the summer of 1940, Great Britain allotted her the production of a large quantity of matériel that the constant threat of bombings no longer permitted the latter to manufacture at home: matériel destined to replace that which had been lost in Belgium and Holland, the equipment of the men in the new armies, and losses suffered on the high seas as a result of enemy operations. This country which, until 1939, had never thought of the manufacture of cannon, was destined to engage in tasks which neither her industrial leaders nor her engineers anticipated.

From the Atlanic to the Pacific, factories sprang up, vast arsenals, operating night and day, which by the end of 1943 had produced arms valued at 373 million dollars, 196 million of which represented the production of 1943 alone.

Contracts were awarded to some twenty-five establishments, each of which did not always manufacture all the pieces entering into a model. The government plant at Hamilton, one of the largest in the country, employing 5,000 persons, manufactured the 40-mm Bofors AA cannon with its mobile mount. The first appeared sixteen months after the official authorization to manufacture them in August 1940. From the beginning of 1944 on, the plant operated at full capacity. These guns were shipped to the United States, to the United Kingdom, to Australia, South Africa, the Middle East and China. A self-propelled mount designed in Canada, was also used by the United States. The weapon was also manufactured with a mount for use on shipboard. From 167 hours during the first month, the average time required for manufacture dropped to thirty-two hours by September 1943. There was also manu-

factured another 3.7-inch (90-mm) gun for high altitude fire, the cost of which was lowered from $1650 to $850. Another piece was the twenty-five pounder (88-mm) field gun, favorite weapon of the Canadian artillery and which played a leading role in General Montgomery's North African campaign.

The execution of British plans in Canada by French-Canadians accustomed to other methods, to other units of measurement and speaking another language, was not without its difficulties. The total lack of qualified workmen presented other problems. It was necessary to bring them in from a distance, to establish a school for apprentices, to construct many lodging quarters. The men and the women of Canada's industrial army had to learn the trade of Krupp and Vickers in a country which had never manufactured a single modern cannon.

The production of telemeters, telescopes, periscopes, sights, pointing apparatus, and field glasses was also undertaken, although in these fields Canada possessed no more experience than in the manufacture of guns. A factory was built for the production of the necessary optical glass. The National Research Council assisted in the construction of the most complex of the apparatus.

Charged with the manufacture of several types of secret apparatus, Canada played a role of the first order, not only in the production, but also in the improvement of radar, in close collaboration with English and American experts. By the end of 1943, half a hundred establishments and several hundred sub-manufacturers were engaged in the manufacture of 4,500 different articles: radio sets and parts, for the greater part, but also radio antennae, radio compasses, signalling lamps, telephone and telegraphic apparatus.

At the beginning of hostilities, the Federal Arsenal of Quebec, with an approximate output of 750,000 cartridges per month, was the only ammunition factory for the army. Its capacity was raised to 50,000,000 per year. A cartridge plant in Ontario, closed since the last war, and a private establishment participated in the manufacture. The increasingly heavy demands of the United Kingdom necessitated the manufacture of still more. The output from Ontario was raised to 100,000,000 brass cartridge shells per month, while the Quebec arsenal reached a monthly figure of 40,000,000 cartridges for ordinary, tracer, armor-piercing and incendiary bullets. It was one of the largest of Canada's war industries with 12,500 employees, sixty-nine per cent of which were women.

For large caliber ammunition, the factories and tools of 1914 had long since disappeared. There remained two factories built in 1937 and 1938 and two other plants manufacturing explosives. More than 130 millions were spent for new factories. The method of instantaneous forging, the single-purpose turning-lathe for the manufacture of shells, permitted a much greater production with limited equipment. Thousands of workmen were recruited, women and girls trained in increasing numbers for new tasks. Mountains of raw materials were collected, and the quantity of machine-tools greatly augmented.

As regards explosives, Canada, at the beginning of the war, was assigned the task of constructing and directing five factories, each of which was to cost from two and a half to eighteen million dollars, and four factories making chemical products which were to cost between one and nine million. In addition to this, she was to occupy herself with the construction of four plants for the loading of shells at a cost of from six to nineteen million dollars and to supervise more than forty auxiliary or complementary establishments of which only nine were private companies. Altogether, they covered an

area equal to that of the city of Montreal.

In addition to the chemical products used currently in the manufacture of explosives, it was necessary to manufacture a dozen others which entered into their composition. It was also necessary to study the methods employed in filling shells. The first factory was ready to begin production eight months from the date its construction had begun; two others, six months afterwards; the fourth, four months later.

Fourth in order of importance in 1935 with twenty establishments and twelfth in exportation, the automobile industry was assigned a program which placed Canada in fourth place among the Allied nations engaged in the production of war vehicles. Every week there came out of her factories, 3,500 vehicles for use in motorized transportation and 300 combat vehicles. Among the 100 types of vehicles produced were full-tracked cargo carriers, patrol cars, tractors and artillery tractors, vehicles for the transportation of troops and ammunition, ambulances, mobile shops, radio and fire trucks.

The number of vehicles registered in Canada, which amounted to one and a half million in 1940, was only 400,000 during the following years due to the restrictions on tires, gasoline and a strict system of priorities. Everything was concentrated on military requirements. In the years preceding the war, Canada had prepared to become the principal producer of motorized vehicles of the British Empire.

In the fall of 1939 came the first order for artillery tractors, the first of which was delivered in March 1940. After Dunkirk, the British contracted for 7,000 more.

The manufacture of armored vehicles began in 1941. In June 1943, the delivery of the 500,000th vehicle was celebrated. By the end of the year, the total approached 600,000. And a method was found for reducting the shipping volume by three-fifths.

Tanks differ so greatly from the other types of vehicles constructed by Canada that instead of the automobile industry, it was her locomotive works that were charged with this task. In June 1940, came a contract for 300 tanks, soon raised to 1,400. The first was delivered a year later. The majority of them were sent to the Soviet Union. The perfection of a process permitting the casting of the turret shell in a single piece constituted, without doubt, the most notable contribution of the Canadian technicians.

At the outbreak of hostilities, Canada had at her disposal fourteen large shipyards and fifteen smaller ones. This figure was raised to twenty-five and sixty-five respectively by 1943. The existing ones were enlarged. Drydocks, wharves, shops, railways, and two enormous floating docks capable of handling two ocean-going vessels at one time were built. From 4,000 men employed during the first quarter of 1940, shipyard employment rose to more than 75,000 by the middle of 1943.

The construction program exceeded the billion dollar mark. A thousand war vessels, cargo boats, and other craft had been constructed by the end of 1943, in addition to several thousand smaller vessels. Eleven ship building and four armament yards were engaged in the construction of vessels of war; five were engaged in the construction of other models of steel vessels, eight produced 10,000 ton freight boats; four made boats of 4,700 tons. Others aided in repairs, sixty small factories provided the smaller craft. In addition, 800 landing and invasion boats had been built by the beginning of 1944.

As a result of heavy losses sustained in the Atlantic, Great Britain had turned to North America for help in constructing freight boats. The first keel was laid in the spring of 1941 and the first freight boat delivered on 21 December. This was

followed by 374 merchant vessels at a cost of 500 million dollars. These were being launched at the rate of three a week in 1943.

In September 1939, the need for war vessels was felt particularly for convoy vessels. The Canadian shipbuilding industry, which in 1935 did not construct more than 4,000 tons per year with a personnel of 4,000 workmen, had never before been called on to furnish tools, auxiliary engines, accessories, or materials. The laying of ten keels in February 1940, marked the beginning of an unprecedented program in its annals. By the end of that year, forty-four corvettes had been launched and fifteen delivered. Total deliveries by the end of 1943 was 322 vessels completed out of 400 launched.

In the Mediterranean, the Canadian corvettes protected convoys during the critical phases of the African campaign and sank enemy submarines. Fleets manned by Canadian crews played an important part in the African and Sicilian landings. In the Pacific, Canadian war vessels collaborated with the United States fleet in dislodging the Japanese from the Aleutians. Canadian mine-sweepers frustrated the attempts of the Axis to paralyze navigation by mining the Canadian coasts. Convoying vessels insured security in the Atlantic, where they were powerfully seconded in their task by aviation.

Without leaving the field of economics, we have seen how great Canada's activity was, an activity in which she learned to know herself and which, after having so greatly contributed to victory, definitely advanced her from the category of an agricultural nation to that of a great industrial power, greatly elevating at the same time the place she occupied among the nations.

German Artillery Division on the Eastern Front

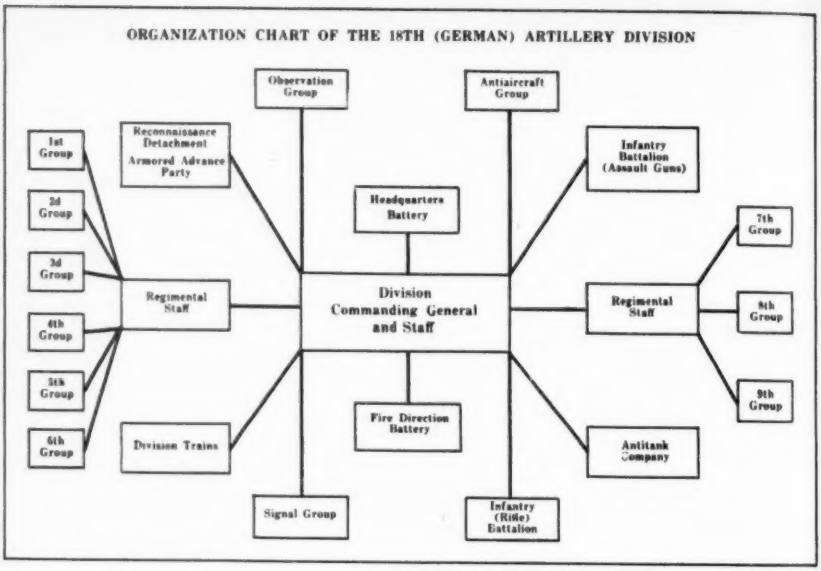
Translated and digested by the MILITARY REVIEW from an article by Captain L. Colorado y Guitián in "Ejercito" (Spain) October 1946.

THE German campaign on the Eastern Front lends itself to observation from a double aspect, a period of more than a year of offensive warfare from the outbreak of hostilities until the autumn of 1942; and a second period that lasted uninterruptedly until the end of the war.

From the battle of Stalingrad on, the German high command frankly admitted that it was on the defensive, and from this time also, the operations became gigantic battles of matériel. At this time, the situation of the German forces was such that it must be admitted that the air power did not have the strength to be a decisive factor, even though Russian aviation was weaker. Neither did the German armament forces have the power to forestall all the threats on the eastern front.

Although the Luftwaffe was always superior to the Russian Air Force, it never could fight uninterruptedly, nor influence ground operations decisively. Weather conditions hindered it, as they also interfered with the armed forces. Therefore, the weight of the defensive battles was always borne by the infantry and the artillery that supported it.

The prolongation of the great defensive battles caused serious losses in the combat effectiveness of the German infantry. This was due to heavy and continuous casualties, and to nervous tension.



As a result, the artillery had to assume an increasingly important role in the defensive.

This last war has proved on almost all the fronts that the fire power of the infantry is no longer decisive, as it was in many battles of World War I. An explanation advanced for the decrease in the effectiveness of the infantry is that the foot soldier sees in armor a support which he desires to exploit in order to avoid hand to hand combat. However, the infantry still plays the decisive role, as it will probably continue to do in the future, for terrain can be occupied and held only by the infantrymen, even if it has cleared of all the opposition beforehand.

In those cases where artillery constituted the backbone of the attacking enemy, counterbattery work was the principal mission of the German artillery. Many times, with the neutralization of enemy artillery, the execution of his prepared attacks was impeded; in others, dense barrages reduced the intensity of the attack, which was easily repulsed by the infantry. The Russians, therefore, decided that they should not attack at any point where German artillery was strong. That the latter could not fulfill the mission completely because of the lack of ammunition was one of the main reasons for the German defeat. Besides, the artillery was not so mobile that it could reach new positions rapidly enough to constitute a new center of artillery resistance.

Divisional and Reinforcing Artillery

The difference between divisional and reinforcing artillery consists principally in their missions and their positions in battle. The former usually fights in a small area and often independently, for its groups (and in most of their missions their batteries, too) must be

armed and equipped so that they will have at their disposal all they need for the execution of an independent task. Reinforcing artillery fights as part of a larger unit.

The missions assigned to the artillery, in the defensive action against Russia, can be grouped as follows: (1) to neutralize the artillery as the main factor of enemy attacking power; (2) to wipe out enemy personnel and tank concentration in assembly areas before the attack is launched; (3) to stop and repulse the infantry launching the attack. In collaboration with the air force it fulfilled the mission of attacking the supply and transport system, as well as interrupting the function of the command.

Since the divisional artillery only had one medium and three light groups, it could not fulfill its mission in those infantry divisions which had a very broad front as was generally the case on the eastern front. In such situations and in other operations, reinforcing artillery and groups from the general reserve with 105-mm guns and 150-mm and 210-mm howitzers were attached and placed under the command of the divisional artillery. In situations of greater importance, the reinforcing groups were placed under direct command of independent regimental staffs, but always under the Commander of Artillery.

In the assigning of missions the divisional artillery assumed, without restrictions, those of direct support, while reinforcing artillery got missions of joint action and counterbattery. This assignment was the general rule, because frequently in some defensive situations this division in assignments did not exist, and both kinds of artillery were used on the same mission.

Some Differences Between German and Russian Artillery

The outstanding characteristic of the use of Russian artillery was its employment in mass. Almost any attack was launched after short but very intense artillery preparation, there being no exaggeration in the reports that as many as 200 pieces were used on a front of one kilometer, although this was not always the case. Furthermore, generally speaking, the Russian artillery was superior to the German in numbers, and sometimes in caliber, by as much as two to one. In favorable weather it was able to offset and sometimes exceed the effectiveness of the *Luftwaffe*, and under favorable weather conditions it gave the Russians a decided advantage.

Artillery command functions were fulfilled through its own chain of command and not through the commanders of the infantry units; but this chain of command was more clearly defined in the Russian than in the German Army. Another outstanding detail was the impossibility of determining the sectors of the infantry units by the concentration of the supporting artillery fire, since rarely did artillery sectors correspond to those of the supporting units. The Russians also give great weight to the tactical decisions of the artillery commander in situations where his arm plays the leading role; the same thing is done with the decision of the generals of the infantry or tanks if their arms are to have the leading part in the operation.

Due to their independent chain of command, Russian artillery was always more flexible than the German.

The 18th German Artillery Division

The multiple missions of the artillery and the lack of manpower to fulfill them required not only a flexible command, but flexible units as well. Only if the unit can execute orders and shift fires rapidly can its commander obtain maximum efficiency. However, the independent regimental staffs, previously mentioned, that went from one sector to another, always

found strange groups from the general reserve under their command.

It was obvious that an organization with constant liaison, with a flexible standing operating procedure, and whose components knew the capabilities of one another, could fulfill certain missions better than the general reserve groups. Based on these conclusions and realizing that only a mass of artillery could produce a decisive effect, the first artillery division was organized in the German Army. By that time the Russians had a great number of divisions of this kind armed with heavy guns from 105-mm howitzers up to 190-mm guns. By grouping two or more of these divisions with one or more rocket regiments, under a single command, they could develop a firepower that was almost insurmountable.

This German division was based on the necessity of employing it as a base of fire in the attack as well as in the defense. It had, therefore, to be completely motorized and capable of moving in any terrain, so that it could move great distances at any moment and under any circumstances. It was to be armed and equipped so that it could face any situation without outside help.

In the selection of its armament, only guns equally adaptable to artillery, and infantry were considered: that is, the 150-mm and 210-mm howitzer. The fact that the 18th Artillery Division was mostly armed with 105-mm howitzers was due to lack of matériel. The units were grouped in two regiments: a lighter one made up of four groups* of 150-mm howitzers, and another, which had a group of 170-mm howitzers, and two groups with 210-mm howitzers. Every group had two batteries and each battery had six pieces.

Since the important thing in this division was its fire direction, it is logical that observation, fire data, and communications were given special consideration. Its communication system was such that all its liaison could be done either by telephone or radio. Its signal group had personnel and equipment equivalent to a similar signal unit of an infantry corps.

In order to have prompt and good observation and reconnaissance, it had an observation group and an armored reconnaissance detachment of four to six medium tanks. The purpose was to have forward observers that could move on the battlefield with relative facility and security.

For the immediate protection of the movement of these forward observers the division had a company or a battalion of infantry assault guns. The forward observer in the tank, accompanied by various assault guns, carried with him not only the fire power of the artillery of the division, but also of the supporting arms.

The division also had an artillery information center which was charged with collecting and evaluating all reconnaissance reports, whether they came from batteries in action, air observation, or the observation groups. For the execution of the mission, it had a visual and sound locating battery, a topographical battery and a reconnaissance troop.

An antiaircraft group was charged with AA defense. It also had a rifle battalion for its immediate ground defense, which in the course of operations saved the group three times from total annihilation, and many times saved it from partial destruction. For fighting tanks, the division had an antitank company.

To safeguard its independence in supply matters, the division had its own trains, seven in number, that circulated between the communications and combat zones. The supply units were motorized

* "Group," as used in this article is equivalent to a battalion.

like the rest of the division, and as a result, a deployment of 100 kilometers forward in twenty-four hours did not cause any interruption in supply. The mobility of this artillery division was, in this respect, the same as a tank division, and at times it was able to advance 150 kilometers and fulfill its mission in twenty-four hours.

This division was the only one of its kind permanently employed by the German Army. Its table of organization was approved in September 1943; it was organized in October 1943, with the remainder of general reserve units of the *Heeresartillerie* and withdrawn in August 1944, not because it had failed in its mission or suffered severe losses, but because most of its groups were attached to other units. It had 148 pieces, including its infantry assault and tank guns, and some 11,000 men.

Lastly, it could be pointed out that in 1944, on the Western Front, the Germans tried to employ not only divisions, but corps of artillery of the *Volkssturm;* but the lack of fuel and ammunition forced them to use only four of their seven artillery corps in the Ardennes breakthrough.

Supply of the First French Army

Translated and digested by the MILITARY REVIEW from a French article in "Revue Historique de l'Armée" (France) No. 2, April-June 1946.

WHILE the victories of the First French Army are well known, it is not so common to find a knowledge of the painstaking and obscure labors of the various sections of the staff which helped to bring about the victory. The reader will not find it a waste of time to follow the Fourth Section (G-4) of the First Army from Marseilles to the heart of Austria.

Before beginning the story of the operations of the Fourth Section, let us briefly examine the missions which devolved upon it and the aid it was able to obtain from the different services of the army.

In addition to preparing the units for the landing in France, the Fourth Section of the army, in connection with the arms and services that it served directly as well as the fourth section of army corps (and at times of divisions), had the following missions to fulfill.

To supply the units of the army with products and matériel of all kinds (food, gasoline, ammunition, replacement vehicles, various materials, spare parts);

To evacuate toward special units or establishments in the interior, wounded personnel, sick animals, damaged or worn-out equipment, and to provide necessary care for men and animals and the repair of equipment;

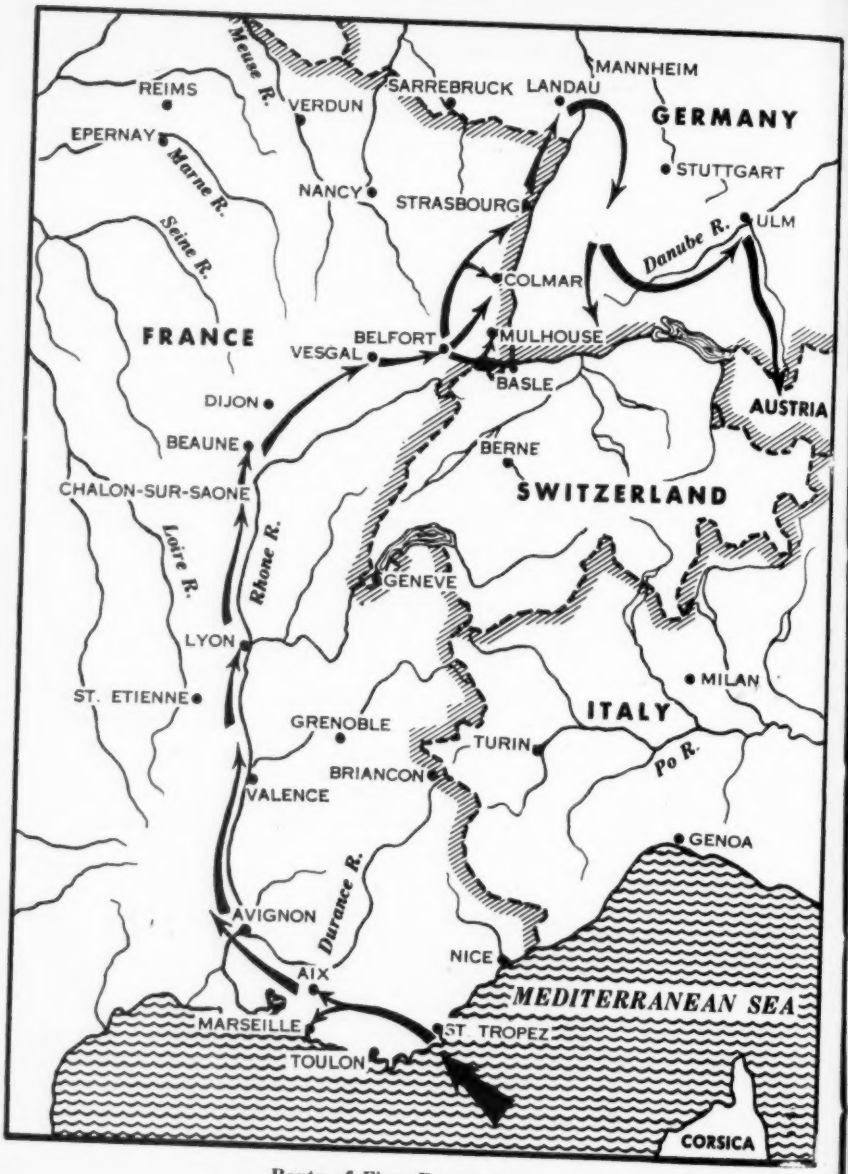
To insure distribution or movement of mail or monies between various units of the army and home country or colonies;

To organize and control all transportation and, if need be, to arrange with air forces for the transportation of supplies by plane;

To regulate traffic on all main routes of army travel.

The First French Army, from the standpoint of supplies, formed part of the American forces, but during the course of the campaign it was obliged to absorb, clothe, arm and feed elements of the French Forces of the Interior.

It was operated, therefore, in accordance



Route of First French Army.

with a mixed, Franco-American system, which made its task particularly complicated. For the execution of its missions, the Fourth Section had at its disposal the command organizations of the arms and the directors of the services who put its orders into execution through their special troops.

The engineers built, repaired, and maintained roads, bridges, railway lines (when necessary), and camps intended for troops. It was, at the same time, charged with de-mining the zone in which the army was operating. In addition to this, it supplied all units of the army with engineer equipment and, if necessary, took care of the repair of the special equipment which the engineer command organization had at its disposal.

The signal communications arm, as regards its relationships with the Fourth Section, was charged particularly with the supply units, with signal service equipment, and with the repair of this equipment.

The trains took care of road transportation with automobile transportation groups, of transportation in the mountains with pack-mule companies, and placed automobile or pack-mule medical companies for evacuation at the disposal of the medical service. In addition to this, it was charged with organizing highway traffic throughout the entire zone assigned to it by the army and with coordinating the action of the army corps within this area.

The *Intendance* Department was especially charged with supplying food and clothing, the management of depots, the repair of clothing, and exploitation of local resources in the army zone in order to obtain the main or the supplementary products required in feeding the troops. It was, in addition, charged with all matters pertaining to administration and accountancy.

The Medical Department was responsible for the condition of the troops from the medical standpoint, took care of the evacuation and hospitalization of wounded, gave them the necessary care and, at times, had the supervision of their reeducation. In addition to this, it supplied the army with medical equipment, drugs and medicines.

The Matériel Department supplied the units with equipment (automotive equipment, weapons, optical instruments, and spare parts) and took care of its repair. In addition to this, it was charged with the provision of ammunition, pyrotechnic equipment and mines.

The Gasoline Department received gasoline and ingredients, prepared it in its depots (auxiliary five-gallon tanks) and then sent it to the army depots where units came for their supplies.

The "Z" Department was charged, particularly with defense against chemical warfare. It saw to it that security measures were observed in the units. It was charged with maintenance and care of chemical matériel.

The Veterinary Department was charged with the task of keeping in condition the animals belonging to the army formations. It had sick animals evacuated, took care of them in its establishments, and kept well animals in the remount depots for replacement. It supplied the units and installations under its orders with chemicals, drugs, and technical equipment. It likewise inspected animals to be slaughtered for meat.

The Postal Department received the mail, money orders and parcels from France, French colonies or foreign countries, sorted it and sent it on to the various units. It also took care of the movement of mail from the army to the outside.

The Finance Department had charge of receipts to the credit of the State and of all disbursements regularly ordered by

the different services empowered to order them. It had charge of exchange operations in foreign countries for the benefit of the army.

As regards the role of the Fourth Section in the operations carried on by the First French Army from the Mediterranean to the mountains of Austria, we might fittingly consider four principal phases:

(1) The landing and pursuit across France as far as the Vosges where the army became stabilized (15 August to 25 September, 1944);

(2) The intensive preparation for the Belfort operations, the beginning of the operation and the action against Strasbourg (26 September to 28 November, 1944);

(3) The preparation of the offensive and reduction of the Colmar pocket (together with the assembly of the army on the left bank of the Rhine (29 November to 9 February, 1945)); and

(4) The extension of the French zone into the Palatinate, crossing of the Rhine, arrival at the Danube, the victory of Stuttgart, and the taking of Ulm (10 February to 24 April).

The first and the fourth phases were characterized by rapid exploitation and occurred in the autumn and spring, while the second and the third were phases of violent and repeated shock operations with great artillery preparations and intensive drives into mountainous and difficult terrain during the rainy and snowy months of winter.

In the first phase, the units of the French Army landed with those of the American Seventh Army on 15 August 1944. They came from Italy, Corsica or North Africa, and in these different countries had been equipped for the landing operations with American supplies. They carried all supplies with them which permitted them to subsist and carry on combat action upon landing (one fire unit, two fuel units, and two to four days' rations).

Simultaneously with their landing, the first elements of the beachhead bases also landed to receive supplies of all kinds until a port could be captured and put in operation.

In the pursuit which followed, the Fourth Section found itself in a tight situation because transportation and service units were lacking for the supply purposes.

The II Army Corps crossed the Rhône south of Avignon and sent some of its elements against Alès, Nîmes and Montpellier, where they were on 30 August. While the main body of the Seventh U.S. Army proceeded up the Rhône valley to attack Lyon from the south, other elements went toward Le Puy, liberated Saint-Etienne and attacked Lyon from the west. Lyon fell on 2 September. Without stopping, they drove rapidly on against Chalon-sur-Saône which was occupied on 5 September, Autun on the 9th, Dijon the 11th, Langres the 14th, and on 12 September, elements on the west effected their junction with the 2d French Armored Division, which had landed in Normandy and which was fighting with the Third U.S. Army.

Nor had I Army Corps remained inactive. It relieved the American divisions in the Alps, in Tarentaise and Maurienne captured Briancon and Grenoble, crossed the Rhône, and seized possession of Ambérieu on 2 September, and pushed as far as Pont-de-Roide and l'Isle-sur-le-Doubs.

On 15 September, one month after the landing, the French Troops were more than 650 kilometers from the point where they had landed.

The forces which landed had increased from 40,000 men and 6,400 vehicles to 165,000 men, 33,000 vehicles and 5,500 animals by 15 September, and were dispersed over

a zone 650 kilometers deep by 250 kilometers wide (from the Loire to the Alps and the Jura mountains) with the American Seventh Army operating between the two French Army Corps.

On 16 August, the army had at its disposal only one transportation company of 100 trucks, or a useful load capacity of only about 300 tons. But on 15 September, over its entire zone, it had the equivalent of seven transportation groups, or a useful load capacity of around 3,000 tons.

The railways of the Rhône valley could not be used; the one in the Alps had been cut in several places. It was necessary to connect its undamaged stretches with other transportation. Even with the loss of time resulting from the large amount of handling necessary, it was possible in the end to get 800 tons daily over this line, which was clearly insufficient for the needs of the army. It was therefore, necessary to make maximum use of highway transportation, trucks coming on certain days to pick up supplies on the beaches and carry them to the vicinity of Lons-le-Saunier over the Alps route (Napoleon Highway).

The transportation groups which had been unloaded on the beaches did not suffice for this task, so unusual solutions for the problem had to be worked out. Around the beach depots, there were several antiaircraft units, heavy artillery of the general reserve (the pursuit made its employment impossible), and even a division. All their vehicles were taken to form transportation elements.

Another division was halted in the process of being equipped in order that its vehicles might be employed for the same purpose.

Military hospitals, whose equipment would have required a considerable number of vehicles, were abandoned and their wounded evacuated to civil hospitals of the region; supplies were taken from the military stores of the area; the proportion of ammunition supplies was also reduced in order that fuel might be given maximum attention.

It was only by these measures that the situation could be maintained from day to day.

From 23 September on, the "Est" railway lines were repaired as far as Lons-le-Saunier and Morteau, and the "Quest" lines from Marseilles to Besançon by 1 October.

The second period was characterized by intensive preparation for the operations planned against Belfort, supplying units and storing the necessary supplies of every sort in the army depots.

The army deployed from the Swiss frontier on the right, through Vesoul, Lure, Le Thiollot, and later to Jussey, Remiremont, Le Tholy, Sainte-Marie-aux-Mines, Ernstein and Offenburg.

In the beginning, the army was served by a railway in the axis of its zone, which permitted shipping supplies to Besançon, then to Clerval from Marseilles, by way of Dijon and Dôle. This line was handled by the Allies who granted us a daily credit of some 3,000 tons.

Later on, when operations moved into the Vosges and the Sainte-Marie-aux-Mines area, the II Army Corps was completely off center. It was at first supplied by highway transportation during the period of bad weather conditions. Then it became possible to carry supplies by railway as far as Bruyères, and at the very end of the period, by way of the Aillevillers, Epinal, Lunéville, Saverne, Strasbourg, Molsheim, and Sales line (later on, directly to Saverne and Molsheim). This railway passed through the zone of the Seventh U.S. Army and a credit tonnage of 800 tons daily was agreed to for us on this line for supplying the units of our II Army Corps.

During this period, the transportation groups were called on to make extraordi-

nary efforts in carrying supplies from stations to depots in the zone of II Corps near Saales and Shirmeck, in transporting elements of the French Forces of the Interior that had to be regrouped and absorbed into the First Army, and in transporting troops during the course of the operation.

The First Army at that time felt the serious difficulties resulting from a lack of repair units, replacement parts, and tires.

Like the preceding phase, this phase was characterized by intensive preparation for attack.

The difficulties pointed out above were again encountered, at least in the beginning, and even intensified since we were to take charge of the defense of Strasbourg.

The fall of Colmar and the alignment on the Rhine gave us the plains of Alsace and also the great lateral highway between Mulhouse and Strasbourg, which was more economical for transportation than the routes we had to use in the beginning in the Vosges.

It is an interesting fact that during the first part of this period, before the attack of 20 January, two of our units were surrounded in the Gerstheim-Obenheim area. The only way they could be supplied was by parachute. A rapid system of supply by this method was perfected by the American Army, which had the proper equipment at its disposal. Moreover, the operation was a complete success.

After 10 February the French Army obtained a foothold in the Palatinate where it was able to seize jump-off positions for the crossing of the Rhine. This was the fourth phase of this long and glorious journey. A depot zone was organized at the head of the Winden railway in the Palatinate near the contemplated crossing points.

First Army's entire effort was bent in the direction of the II Army Corps upon which fell the honor of crossing the Rhine on 31 March.

In Germany, there was not a railway that could be used. It was still necessary to make maximum use of highway transportation to supply our troops who were rapidly exploiting their success. The problem of food supply however, was simplified to the extreme: the Army lived off the conquered country.

A depot zone was opened in the Bretten-Bruchsal area, then another in the Tuttlingen area.

The 9th Division of Colonial Infantry, which was charged with reducing the Black Forest, obtained supplies for its elements operating along the Rhine from the army depots in the Colmar area.

After taking Ulm, the army turned toward Austria. It was necessary to establish advanced depots rapidly without drawing on existing army depots which were being used for reprovisioning the units engaged in mopping up conquered territory. An aerial supply system operated by planes of the French Air Force carried fuel for forty-eight hours to the area south of Sigmaringen where the advanced depots were established.

On the collapse of Germany, 9 May 1945, some of the units of the army were 350 kilometers from their point of departure after a month's campaign.

General de Lattre de Tassigny, Commander in Chief of the First French Army, said often that he had required miracles of the Fourth Section and that it had performed them.

These miracles are not recorded in mathematical form. They were the result of a compromise between judicious utilization of the limited means at the disposal of the army, and the rapid choice of daring solutions which permitted at all times flexibility and speed in operations.